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In This Issue—Oil, Rubber and Highways

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MOTOR AGE

Vol. XL
Number 6

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CHICAGO, AUGUST 11, 1921

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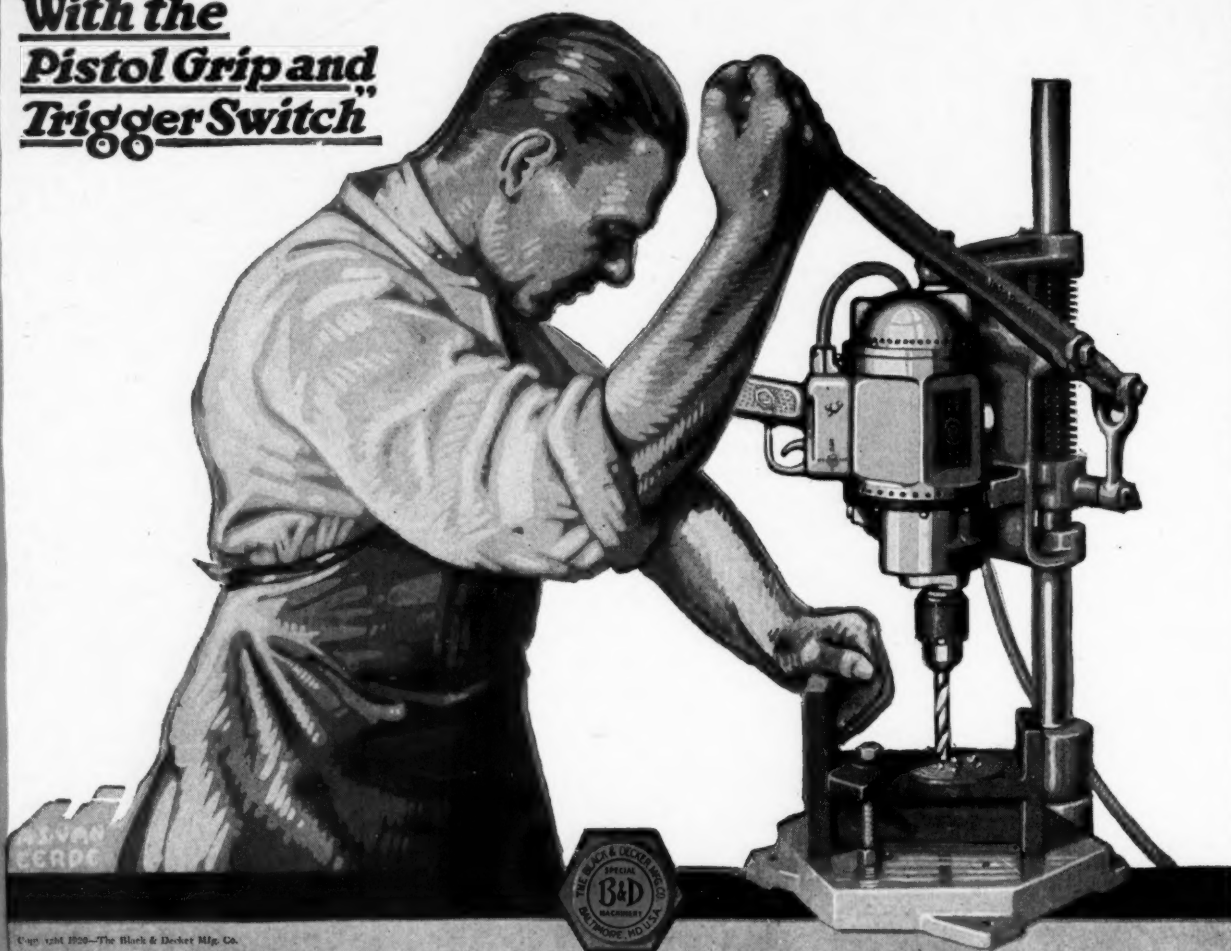
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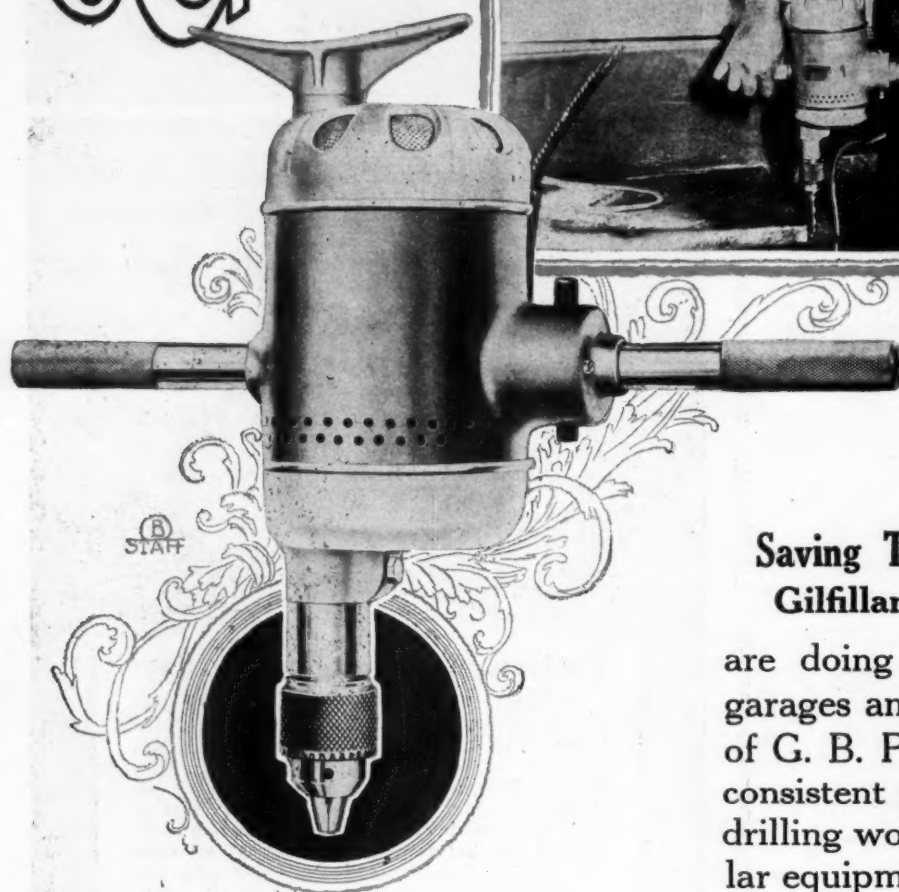
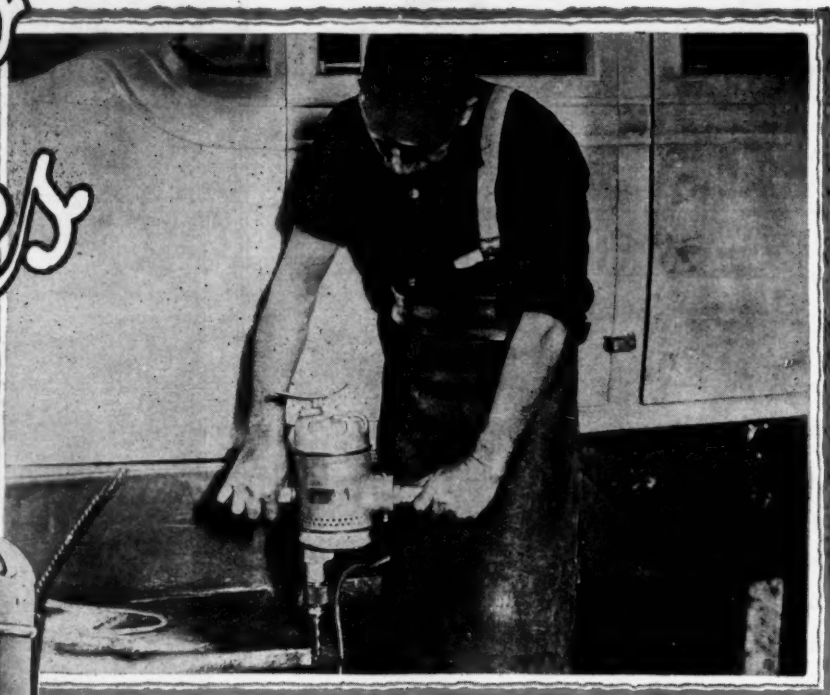
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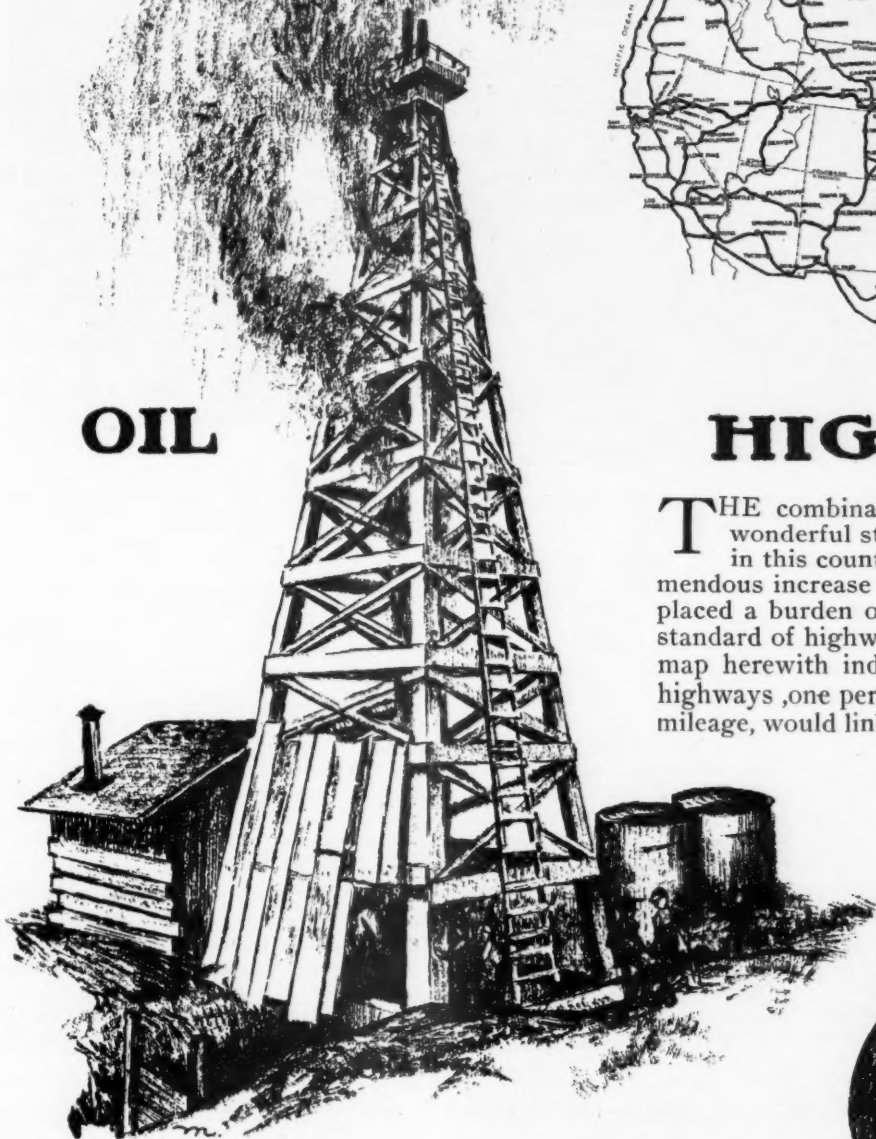
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MOTOR AGE

OIL



HIGHWAYS

THE combination of oil and rubber has been a wonderful stimulus to the building of good roads in this country. It also has, by reason of the tremendous increase in tonnage hauled over these roads, placed a burden on them which has compelled a new standard of highway construction for the future. The map herewith indicates how 25,000 miles of Federal highways, one per cent of our total American highway mileage, would link up the important centers and ports.



RUBBER

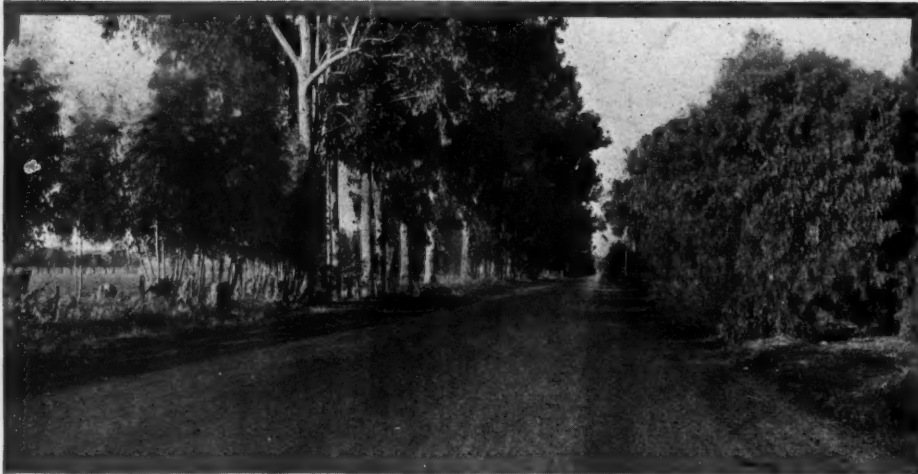
FIGURES from the American Petroleum Institute show that in 1920 the world's oil production was 688,474,251 barrels. Petroleum draws trains, street cars and motor vehicles. It pumps water, hauls heavy loads, replaces millions of horses and in 20 years has become a farming, industrial, business and social necessity. The airplane has been made possible by it and it has helped motorboats set speed records of nearly 80 m.p.h. Petroleum has brought the city to the farmer's doors and changed the very nature of our whole rural life.

THE present scientific methods of producing rubber compared to the old way of boring into the unknown depths of a wilderness for the purpose of tapping the rubber trees, has given ground to the modern era of carefully tended rubber plantations, where the supply of rubber can be depended upon for years to come. Half a century ago its uses were rare. To-day hardly a business exists but uses rubber in some form. In the automotive industry, it is tires. Last year the world's rubber production from all sources was 403,000 tons. Out of this there were made 32,400,000 tires for cars and trucks alone.

Oil—Rubber—Highways

Three Business-Building Factors

All Measures for Increase in Supply of the Two Former and Economical Construction and Maintenance of Latter Are Matters of National Moment



A stretch of good road, such as has been made possible in various parts of the country by oil and rubber

PETROLEUM, caoutchouc, and roadways, — this three-in-one combination of potential forces has been of tremendous value in promoting and building up the business, rural and urban, of the entire United States. Its successful development is playing a dominant part in agriculture and commerce because motor transportation is wielding a constantly growing influence in both freight and passenger transportation. The basic factor of this triangular power is, of course, oil. Of this product, and its far-reaching effects on modern life, Franklin K. Lane, former Secretary of the Interior said:

"Petroleum draws railroad trains and drives street cars and motor vehicles. It pumps water, lifts heavy loads, has taken the place of millions of horses, and in twenty years has become a farming, industrial, business and social necessity. The naval and the merchant ships of this country and of Europe are fitted and being fitted to use it either under steam boilers, or directly in the engines. The airplane has been made possible by it. It propels that modern juggernaut, the tank. In the air it has no rival, while on land and sea it threatens the supremacy of its rivals whenever it appears. There has been no such magician since the days of Aladdin as this drop of mineral oil. Medicines and dyes and high explosives are distilled from it. Men search for it with the passion of the early Argonauts,

and the promise now is that nations will yet fight to gain the fruitful beds in which it lies."

Since 1918 the search for oil has been conducted with dynamic vigor. At that date, the United States produced 355,000,000 barrels, or 69.15 per cent of all the oil pumped in the entire world. Of this production, California in that year pumped 101,636,870, or nearly one-third of the total. California is more or less underlaid with vast lakes and deposits of oil. It is overlaid with a widely distributed system of state and county highways which are traveled by a vast number of automobiles, and by a large number of trucks and automobile stages. Tens of thousands of automobiles owned by motorists coming into the state over the great trans-continental highways add

to the volume of traffic using these roadways. Oil is the motive power of all this traffic.

From 1876 to 1919, both years inclusive, the production of oil in the state was 1,242,458,480 barrels. From January 1st, 1920, to December 31st, 1920, the production was 105,721,186 barrels, making a total production since 1876 to that date of 1,348,179,666 barrels. Oil production in California has increased and gone hand in hand with the constantly growing use of motor cars, trucks, and motor stages. Casual observers may be surprised to learn that more automobiles are owned by farmers than by any other single buying class. Thirty-three per cent of cars owned and used in the United States are in districts under 1,000 population, 22 per cent in communities between 1,000 and 5,000, and only nine per cent in cities of 500,000 and over. The figures for the last three years in California show a total production of 308,580,840 barrels, or 102,890,280 barrels annually. In 1920 the production of crude oil in California was 4,499,402 barrels over 1919.

EVOLUTION OF RUBBER INDUSTRY

The evolution of the rubber industry from its wild state to the present cultivated plantation stage has placed that industry on an absolutely firm commercial foundation. It has been systematized and standardized until all difficulties have been disposed of. The rubber crop of the future can be depended on. The present scientific methods of producing this crop, compared to the old way of boring into the depths of unknown wildernesses for the purpose of tapping the rubber trees, has given ground to the



Typical scene in the oil districts of Southern California. The production of

modern era of carefully tended plantations, where the supply can be depended upon. There is now hardly a business or enterprise of commercial magnitude which does not employ rubber, in some form, to carry on its work. Half a century ago its uses were rare. Today the product has an almost universal influence throughout the world. Chemistry has added its genius in developing the raw material, and capital has invested many millions in the various manufacturing factories in which rubber is the vital factor.

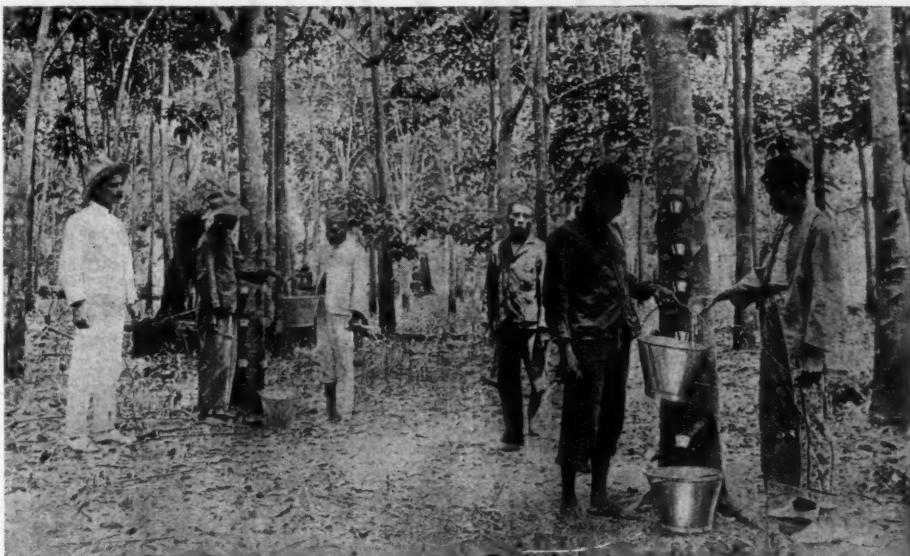
It is too early yet to determine what the future will bring forth in the way of new supplies of raw caoutchouc. Experiments are being carried on extensively, and, as the demand is increasing, the ingenuity of man will be taxed to meet this call. The Mexican shrub called the guayule presents an interesting angle in the matter of supply, yielding a crude product of about 55 to 60 per cent raw rubber of medium quality. Whether the South American or Straits Settlements trees, the para, or the hevea types, can be raised in Mexico, or in the southern states, cannot yet be positively affirmed or denied. Whether there is a field for their exploitation nearer to the United States than their present habitat is a debatable question. But there will be no half-way measures adopted by those interested to solve these problems.

MOTOR CLUBS EXERT BIG INFLUENCE

The enormous increase in the number of automobile clubs and organizations all over the world, and especially in America, with such clubs as the Automobile Club of Southern California, with a membership of over 55,000, the powerful clubs of New York, Chicago, Cleveland, San Francisco, St. Louis, Boston and scores of other cities, is all an outgrowth of oil, rubber and highways. The roster of these organizations, both in the states and the cities, mounts up into millions. Their activities on behalf of good roads alone has made them nationwide factors in modern highway construction. Twenty years ago their influence was negligible; today they occupy both a private and a semi-public position of vast importance.

The combination of oil and rubber has been a wonderful stimulus to highway building in California. It has also, by

First Move in Evolution of Tire



Gathering raw caoutchouc from rubber trees on a modernly planted and scientifically managed rubber plantation

reason of the tremendous increase of tonnage now hauled over these highways, placed a burden on them which has compelled a new standard of highway construction for the future. More thickness in surfacing, infinitely greater care and attention to preparing the subgrades and foundation, wider highways, and a richer concrete mixture, together with closer attention to a permanent location of road routes, are some of the requirements in modern road-building which modern traffic conditions imperatively demand.

The mileage of paved state highways in California is estimated at 1800 miles. Paved county highways are approximated at 3300 miles. About 60,000 miles of other than first-class highways include the balance of the state and county roadways. State highway mileage still to be constructed under the three state bond issues, aggregating \$73,000,000, is 3978 miles. Aside from federal aid contributions, the state now has nearly \$39,000,000 available for this work. Concrete, asphalt, patented surfacing, gravel, macadam, shale, oiled macadam and dirt roads are included in the above estimate of mileages.

One of the pressing problems of future

highway building concerns maintenance. The recent caution uttered by President Harding regarding the urgent necessity of highway maintenance is strictly to the point in connection with all highway building. Modern traffic demands a rigid supervision of the roads in order to repair them as soon as they begin to show signs of disintegration or wear. The old adage that "a stitch in time saves nine" is peculiarly applicable to highway preservation. Eternal vigilance in inspection and maintenance is the price of a reliable and economical highway system. With transcontinental roadways extending from the Atlantic to the Pacific, and the building of additional coast-to-coast roadways, and the colossal sums of money already spent and being appropriated by both state and federal governments, the problem of road maintenance is an important part of the nation's business.

THREE POTENT FACTORS IN NATION'S PROGRESS

Oil, rubber and highways form a triumvirate of potent factors in America's upbuilding which are more important year by year. All measures for the increase in the supply of the two former and the economical construction and upkeep of the latter are matters of national moment. The quest for oil is now world-wide. The demand for rubber has enlisted the attention and activities of capital in all countries. The problem of highway building has become so imminent that even now European engineers are visiting the United States for the purpose of studying our methods of construction. It is not too extravagant a prediction that these three basic factors in national prosperity may yet have a federal bureau devoted to their consideration in the nation's capital, as commensurate with their widespread and state-important influence from the Pacific to the Atlantic and from the Great Lakes to the Gulf of Mexico.



crude oil in this state last year was 4,099,402 barrels over the year 1919

The SERVICE MANAGER Speaks:

He Believes in Keeping the Shop in a Neat and Orderly Manner and in Protecting the Owner's Car While in the Shop

Editor, Motor Age

THE word "service" is variously construed. Some customers think that it definitely embraces all repairs, tow-in charges, adjustments, deliveries, washing and polishing of their cars for an indefinite period after delivery. With others, it covers the many vague promises made by salesmen, who in their eagerness to "close" a sale, are inclined to gloss over to the buyer just what rights and privileges he is entitled to after delivery.

Perhaps the greatest trouble the service manager has to combat is this widespread and erroneous idea of the meaning of "service." This conviction that a car, once bought, should, for a long while at least, cost the purchaser nothing, is not what this word should convey. All reputable automobile manufacturers agree, for a certain length of time, to make good any imperfections in a car, but the labor of installing new parts (replaced by the factory) must rightly be paid for by the customer. If the buyer will only bear in mind that an automobile factory manufactures parts and not human labor, he will realize the justice of this.

My interpretation of "service" is based on four principles: first, proper design and workmanship in the car; second, an efficient and loyal organization, with adequate facilities to do any work in the proper manner, at a commensurate charge; third, a service station whose personnel is fully aware of the importance of making the owner a satisfied customer; fourth, the spirit of co-operation and loyalty on the part of the purchaser.

SERVICE BASED ON FOUR PRINCIPLES

If the foregoing principles are carried out, the difficult and sometimes unpleasant problems with which a service manager is confronted are greatly modified and the head of the service department will enjoy the confidence and friendship of the car owner, who, after all, is a salesman for the organization, though not on the pay roll.

The average motorist knows very little regarding the mechanism of his car, and it is not only the duty of the sales organization but of the service department to explain, objectively, the operation and adjustment of the car purchased. This



J. Kemp Goodloe, service manager,
Triangle Motors Co., Louisville, Ky.

is not a long and tedious affair. An explanation couched in plain, simple English stripped of technicalities, can be made while showing the parts in their relation to each other.

By an interested and friendly attitude and by meeting the owner, if possible, the service manager, or his floor service superintendent, can create a good impression and pave the way for possibly more than is called for on the order. Indifference and too much "red tape" when the owner brings his car into the service station tend to put him on the defensive and in an argumentative mood as to whether his car should have developed this or that trouble.

METHOD OF GAINING CUSTOMER'S CONFIDENCE

Of course, if the owner comes to the service station with a just complaint, the matter of adjustment is plain. The owner who feels that he is welcome and that the organization is anxious to make good any just complaint, will unhesitatingly endorse his car and the company from which he purchased it, and he will

go out of his way, not only to sell motor cars, but service.

As a majority of car owners, especially those who are driving or having chauffeurs drive their first cars, are not familiar with items charged them or terms used on invoices for parts and installation, a method used in this station for simplifying and explaining such charges is herewith outlined.

I send to the stockroom and have brought to my office duplicates of such parts as have been installed, and explain to the buyer just how such parts are replaced and the time it takes to do the work. I also take the owners through the shop, where work similar to theirs is in progress. This gives the customer a working idea of things and tends to convince him that the charges are legitimate.

I may add here that the shop is always kept in a condition of neatness and order, and the view obtained by the customer of a shop so kept reassures him as to conditions that affect his car while in for repairs.

Right here I want to emphasize a point. The service department cannot be too careful in the matter of protecting the owner's car while in the shop for repairs. All parts must be kept off of running boards and put into suitable receptacles. Fenders and seats must be covered when cars arrive in the shop. Mechanics are prone to lay tools, parts, etc., on the running boards, and even in the car, and as such parts are generally in a very oily and dirty condition, any improvement over old and careless shop methods marks a step in the right direction.

SERVICE AND SALES ORGANIZATIONS INTERDEPENDENT

The service and sales organization are absolutely interdependent and mutual consideration should be shown each to the other.

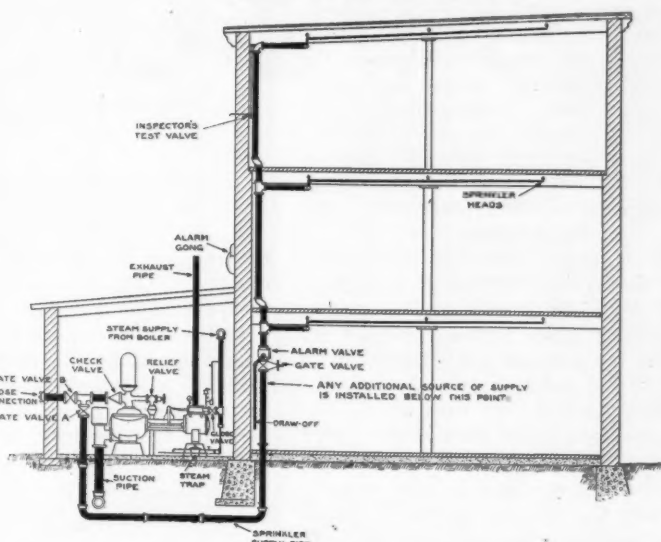
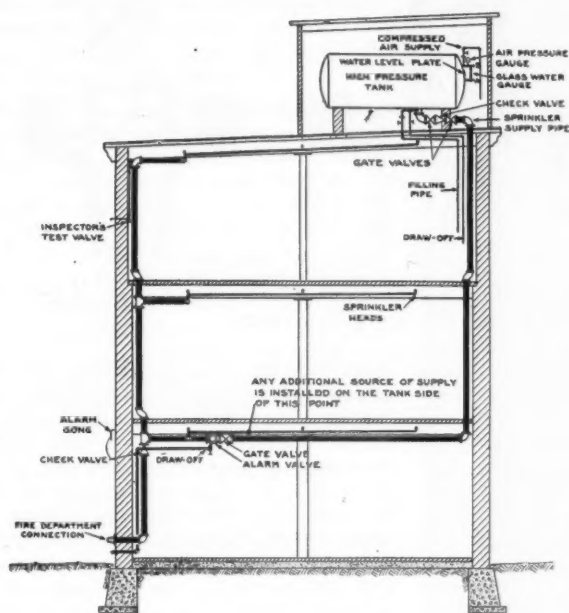
The service manager is always glad to handle any repairs or adjustments which may be termed emergency service, but as the day's work is laid out approximately 24 hours ahead, any rush or extra work which is sometimes promised by the sales department should be arranged for with the service manager before any cars are sent to the station or promise of work given the owner.

In order to keep faith with the sales department, the service station manager should bear in mind that any cars which

Concluded on page 15

Who Pays the Bill?

Some Facts Garagemen Should Know
Regarding Fire Prevention
In Two Parts—Part II



Left—Diagram of pressure tank system. Right—Steam fire pump supply. Either of these systems are considered 80 per cent equipment, as is also the gravity system on opposite page

NOW that the advisability and value of sprinkler system installation has been demonstrated, let us see how the systems work and what the conditions are under which they work best.

Starting with the automatic heads upon which the whole system depends Fig. 1 illustrates the mechanism of one of them—perhaps the first successful one. Other devices were patented in England as early as 1723 and again in 1812, but they were not practical, probably mainly due to the lack of pipe installation and pumps for supplying water.

In 1864 Major Harrison, an Englishman, invented and designed a complete sprinkler system and in 1874 Harry Parmelee patented and installed the first practical sprinkler in their country. But it was not sensitive enough, being kept cool by the water in the pipe. It remained for Frederick Grinnell to discover the first really sensitive and practical device which kept the fusible trigger isolated from the body of the device and the cooling effect of the water.

Fig. 2 is the design the Grinnell Co. uses today. Comparing B and C it will be seen that 1, 2, and 3 are three interlocking parts which are assembled at B but released at C.

These three little parts are the brains of the device. They are normally held together by a very fusible alloy patterned after Sir Isaac Newton's discov-

When the fire starts the water starts

ery. A shows the three parts fused into one, but when heat exceeding 165 deg. Fahr., is applied to this combination, the joints melt and the spring diaphragm 4 and the water exert so great a pressure on the glass ball valve 5, that the parts are separated as in C and thrown bodily out of the way by the rush of water as it escapes.

These heads are placed throughout the building near the ceiling and spaced so

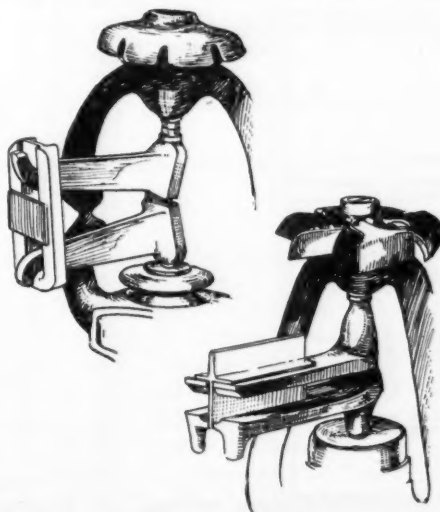


Fig. 1

Two types of head used by the Automatic Sprinkler Co. of America. The fusible element connects the two arms

that there is one for each 100 sq. ft. of floor space, though this spacing varies down to 80 sq. ft. in some buildings and must be determined by the underwriters.

The supply pipes are generally parallel and are supplied by a main at one end and at right angles to them. When there is more than one floor and they are all the same, a vertical riser connects one end of all the mains.

QUANTITY AND PRESSURE OF WATER NECESSARY

As stated before, this is all very simple, but the system of supplying water in sufficient quantity and at sufficient pressure is another affair and a much more complicated one.

In towns where water pressure is high enough to give 12 lbs. of pressure at the highest sprinkler heads when a nearby hydrant is flowing 500 gals. per minute, an ideal supply is found. It is simple, effective and inexpensive. There are, however, so many times when the city service is not entirely dependable that underwriters only consider it 50 per cent equipment. On Saturday night when the villagers all take their baths the pressure drops materially as it does after supper when they all get out to sprinkle the lawn. Therefore, to have 100 per cent equipment and get the greatest possible insurance reduction, there must be another source capable of supplying water at high pressure for a considerable time.

There are three principal ways of getting water to the sprinklers other than via the city water supply: 1, gravity

tank; 2, pressure tank, and 3, automatic fire pump. Outside auxiliary connections for local fire department are usually furnished beside two other sources.

Any one of these three systems constitutes an 80 per cent equipment, any two systems constitute a 100 per cent equipment, or any one in combination with a proper city water supply gives 100 per cent equipment.

The modern electrically driven centrifugal fire pump is probably the simplest device, since, connected with the public service electrical supply it is ready for business at a second's notice and needs no more care than an occasional test to see that it responds to the automatic switch. It is especially good for the dry pipe system because unlike the tanks, it can be kept in a warm place with only enough water for priming. It will always work—all it needs is a reduction in pressure on the system caused by the opening of a sprinkler head.

The gravity tank requires almost no care aside from keeping it from freezing in winter and keeping it full—and devices automatically take care of the latter by making a great fuss if the water gets above or below certain levels.

The steam fire pump is also a good device but is useless unless there is steam pressure available at all times. It would be too expensive to maintain steam pressure for this use alone, but given the available steam, the pump is most reliable though it cannot well be made automatic. It would not appeal to the garageman since he seldom has steam enough for heating purposes, and what steam he has is low pressure and hence of no use.

The pressure tank would be more suitable for garage use since the garageman usually has air pressure and knows how to handle it. These pressure tanks are filled about two-thirds full of water and the space above the tank filled with a sufficient pressure to expel all the water and still have some pressure left. The tank must be located on the top floor or on the roof, but it is not so exposed

The Business End of the Sprinkler System

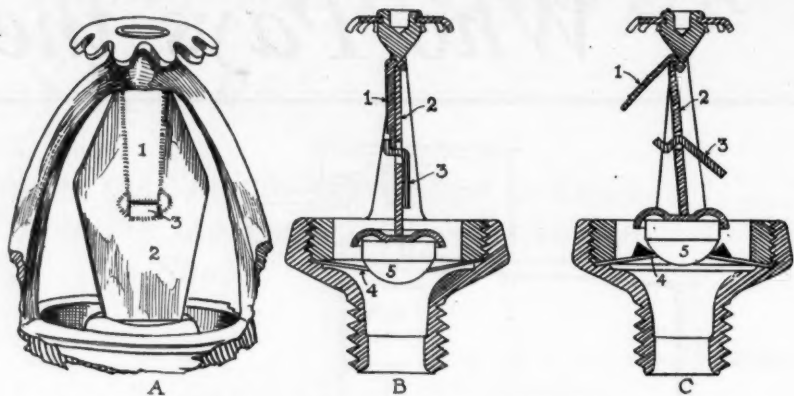


Fig. 2—The Grinnell sprinkler head. Everything is thrown out of the way except the spring diaphragm

to freezing as the gravity tank which must be 20 ft. above the highest sprinklers.

Where there is dead storage of cars in winter the temperature frequently is allowed to go below freezing and here the sprinkler system containing water would not only be ruined by bursting pipes, but be inoperative in case of fire.

RELATIVE ADVANTAGE OF DRY PIPE SYSTEM

Here the dry pipe system is of great value, and while for some reasons it is not so desirable as the wet, it is more desirable for others.

A dry pipe system, instead of containing water at a high pressure, contains air at a comparatively low pressure—only one-half to one-third the water pressure. The air pressure controls the water supply through a special dry pipe

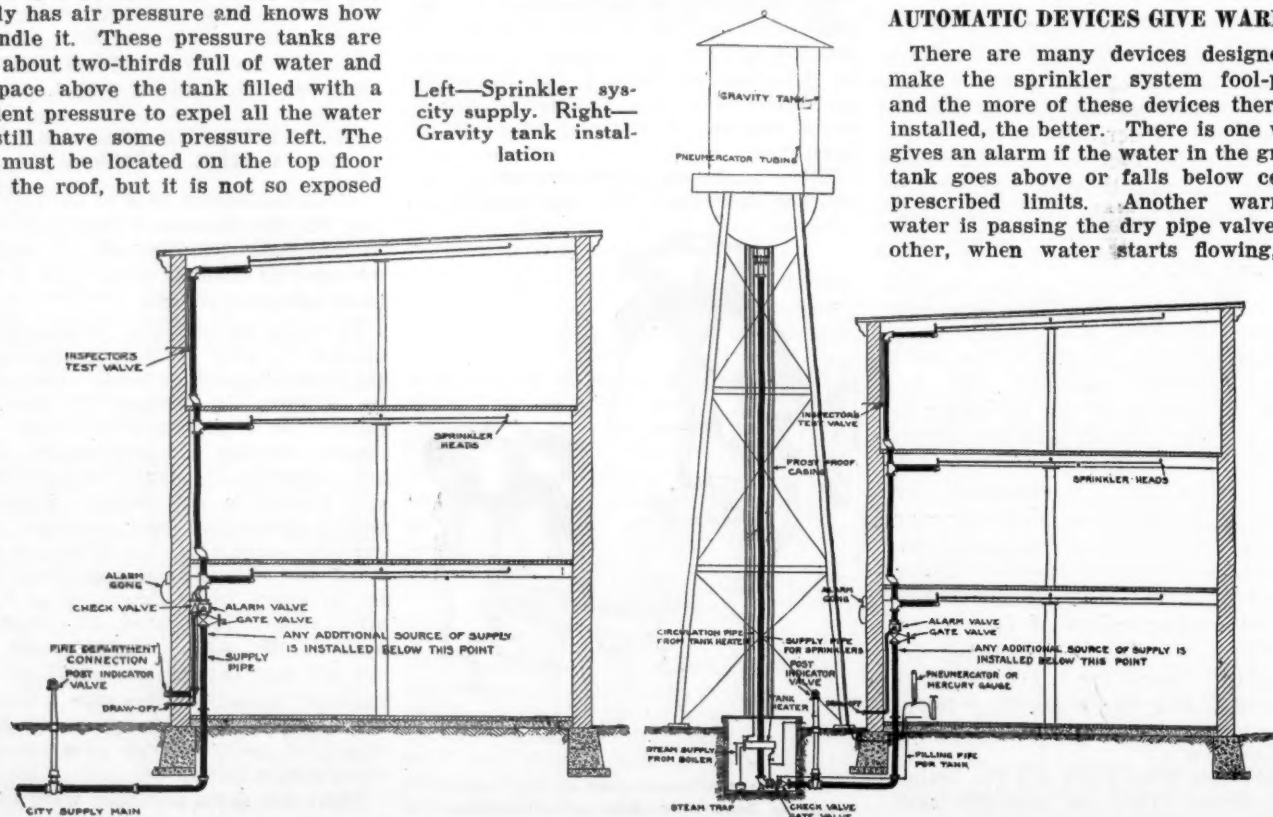
valve, the air pressure holding the valve closed and keeping the water out unless the air gets below a certain pressure. It is, of course, imperative that the air pressure be maintained to the proper point, for if it falls low enough to allow the water to force its way through the valve it will enter the system until the air pressure balances the water pressure and remain there until drawn off. In freezing weather this would be disastrous, though no damage would be done when it is warm.

When a sprinkler head opens in a dry pipe system, the emission of water is not quite so speedy as in a wet pipe system, but the difference can only be measured in seconds since the water will follow the line of least resistance and come directly to the open sprinkler, and since the water is at a pressure perhaps three times as great as the air, the air will offer little resistance.

AUTOMATIC DEVICES GIVE WARNING

There are many devices designed to make the sprinkler system fool-proof, and the more of these devices there are installed, the better. There is one which gives an alarm if the water in the gravity tank goes above or falls below certain prescribed limits. Another warns if water is passing the dry pipe valve; another, when water starts flowing, and

Left—Sprinkler supply. Right—Gravity tank installation



another, when pressure in the pressure tank is too low. Some kind of a signal is furnished for every point where the system could possibly fail. Even the shutting of valves is recorded, but in spite of that the largest percentage of sprinkler failures is due to closed valves. In these cases someone shuts the valves, disconnects the warnings so they will not be annoyed by them, and then proceeds to forget about them.

Closed valves head the list of sprinkler failures, and were it not for the vigorous inspection of insurance interests, would result in more failures than they do. It is hard to understand how employees will jeopardize their employers' interests and their own jobs—but they do. Sometimes the valves are shut while a leaky pipe is repaired, and then never opened again. Sometimes they are shut maliciously. Usually, however, it is the result of some ignorant watchman's effort to be of service. The following story furnishes a good example.

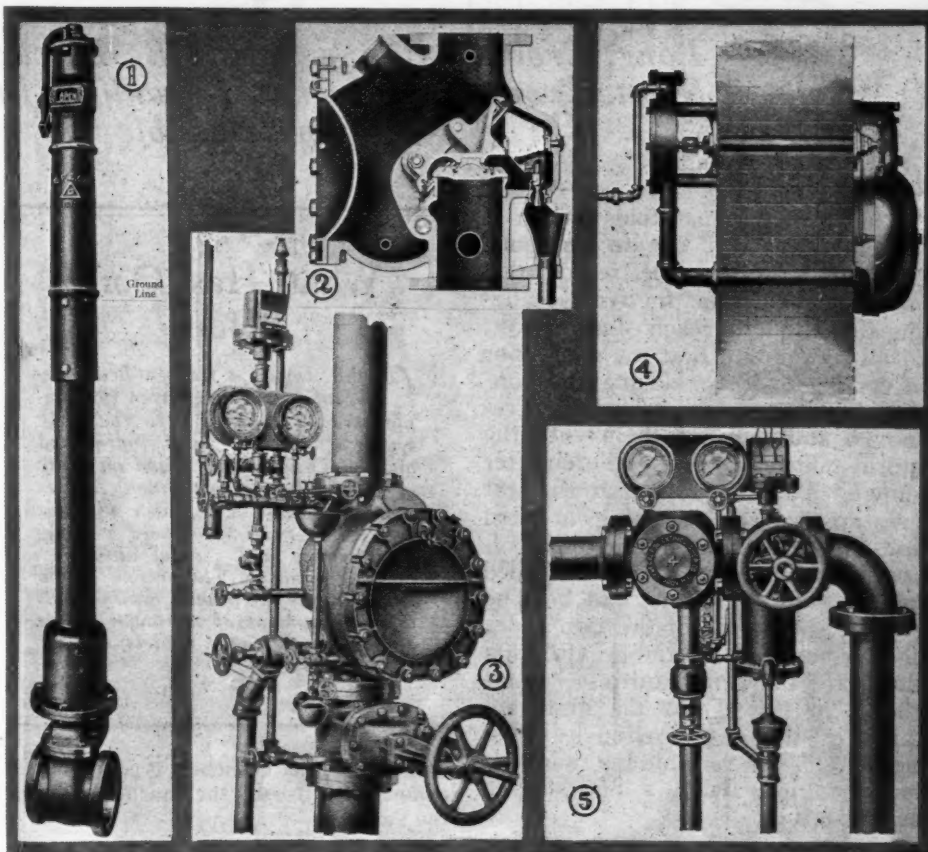
GRAVITY TANK SHUT OFF

A watchman on his rounds discovered a sprinkler head going full force in the basement. There was no apparent fire, so he decided to shut off the water. The only valve he knew about was at the top of the building, so he hurried to the top floor and closed it, shutting off the gravity tank supply. Instead of notifying the fire department, or someone in authority, he started again on his rounds. In the meantime the fire gathered headway, for there really was a fire, and when he reached a lower floor again, had gotten so bad that he was afraid to return to the roof for fear he could not get down. He then called the fire department, but before it could respond the fire was beyond control, and the building and stock were almost completely lost.

Many garagemen believe they are exempt from fire losses which occur to cars left in their care. One will find signs posted in garages to that effect. Perhaps they are. Perhaps the notices make them so. At any rate, the attached item dealing with a case in the Supreme Court of Colorado seems to disprove the fact, and one cannot overlook a decision of a supreme court, even though he feels he is right.

There is another angle to the sprin-

A Few of the Controlling Devices



1—Post indicator valve installed outside of building. 2 and 3—Dry pipe valve, sectional and exterior. 4—Water motor alarm which rings when water starts running. 5—Alarm valve

kler protection which is of interest to storage garagemen. They have no stock that is in danger, but they have some very valuable stock belonging to their customers. If they can show their customers that this stock is perfectly safe from fire they have a very good advantage over their competitors in getting business or in getting better prices. Summed up, they pay less for their insurance, get business more easily, have more contented customers, and are able to demand higher rates. Is this not worth investigating?

Two or three fire reports from the

N. F. P. A. Quarterly may be of interest as showing the cause of fires and the action of sprinklers:

SEVEN SPRINKLER HEADS EXTINGUISH FIRE

"S-5949. This fire is interesting in the fact that the original fire was practically extinguished with hand chemical extinguishers, but the employee who was working on the automobile in which fire originated had about three gallons of gasoline in an open pail, which was kicked over in the excitement just as the original fire was under full control. The vapors from the gasoline were ignited and consequently a flash fire resulted which opened seven heads; these delivered a large volume of water which completely extinguished the fire before the city department arrived on the ground."

"S-19040—Garage. An employee was cleaning a detached automobile motor with gasoline when another employee accidentally touched the motor with a wire from battery, causing a spark which ignited the gasoline. One sprinkler head operated and extinguished the fire before the arrival of the department."

The average sprinkler system will probably never need to function, but it must be ready at any minute, and if ready, will stop a fire which otherwise might entirely wipe out the business.

Garage Owner Responsible for Cars Burned

THE Supreme Court of Colorado in May, 1921, affirmed the decision of the trial court in the Jacquith-Parris Brothers case, which has been in the courts ever since 1917. The court thus holds that a garage owner is responsible for the loss of a car which is burned in his garage. Jacquith sued Parris Brothers for \$1,350 soon after the loss of the Jacquith automobile in the destruction of the Western Colorado Motor Sales Co. at Grand Junction. He won the case and Parris Brothers carried it to the Supreme Court. Parris Brothers were ordered to pay the costs and interest on the money.

INTAKE MANIFOLDING

Long, Crooked Piping Should Be Discarded and "Hot Spotted" or Water Jacketed Manifold Installed Whenever Possible

FEW of the manifolds shown in Fig. 1 and 2 are to be found any more for the reason that most mechanics instinctively realizing that the long reach of pipe is out of all reason and that the gas vapor is certain to lose velocity and condense during its long travel, have removed and replaced them with the more efficient types hereinafter shown. Then, too, owing to the first mentioned effect, starting is hard and, oftentimes, impossible without recourse to priming. As recommended before, such manifolds had best be replaced with one of the two types shown in Figs. 3 and 4 although these are far from faultless. That shown in Fig. 4 has the disadvantages of the one previously illustrated as being suitable for twin-cylinder engines with a 360 degree crank setting.

As the firing orders of all four-cylinder engines is either 1-2-3-4 or 1-3-4-2, it naturally follows that with either of the manifolds shown two cylinders will always receive an over rich mixture while the other two will be handicapped by semi-starvation. With the first firing order and the manifold shown in Fig. 4, cylinders 1 and 4 will always have a tendency to load while cylinders 2 and 3 will not receive their full quota, for the reason that, on account of the lag between impulses in the branches of the manifold, condensation takes place and number 1 and 4, being the first to aspire after the interval draw in the raw fuel condensed in the branches.

If the other firing order is used, namely 1-3-4-2, cylinders 2 and 3 will be oversupplied, while numbers 1 and 4 will suffer from a lack of fuel. The other form of manifold, shown in Fig. 3, is an improvement although the distance from carbureter to valves is not so well equal-

What Has Gone Before

IN the August 4 issue a brief history of manifolding from the simple, straight inlet pipe to the early types of branched and four-ported manifolds such as are found on many of the older four-cylinder engines still in service, was given together with a few reasons for hard starting, condensation and general unsatisfactory performance. The present article will continue the treatise dealing with the development of the manifold as applied to the later models of four cylinder engines.

ized as in the branched type. This is compensated for by the shorter travel of the gas.

It will be found that the last considered manifold gives the best results when used on an engine with the 1-3-4-2 firing order although it is fairly efficient with the other order. Its efficiency is

bettered greatly by water-jacketing and hot-spotting. A makeshift which also improves performance is shielding from the fan draught by means of a simple sheet metal housing.

The adoption of block cast cylinders did much to improve the performance of intake manifolds. Water-jacketing, while a step in the right direction, left much to be desired as the small pipes were prone to clog and freeze and too much time was required to get the carbureter heated. Likewise "hot-spotting" has proven of value but has by no means reached perfection, the errors being upon the side of too much heat and a consequent lowering of volumetric efficiency on account of the undesirable over-expansion of the incoming charge.

One of the greatest advances has been the introduction of the internal manifold, if such it may be called, formed in the engine block at the time of casting. Surrounded completely by the water, it is kept at a uniform temperature which has a decided effect in preventing condensation. Some examples of internal manifolds are shown in Fig. 5, 6, 7, 8, 9, 10 and 11. Of these Figs. 7, 8 and 9 are to be preferred on ac-

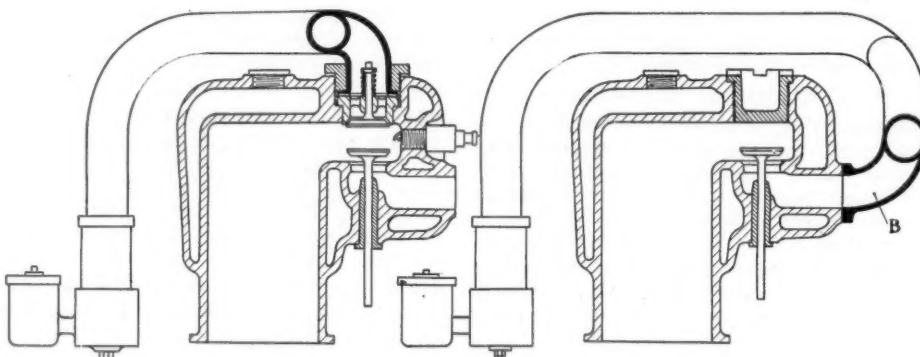


Fig. 1

Fig. 2

Obsolete manifold forms which are most inefficient on account of the long passage and abrupt ends

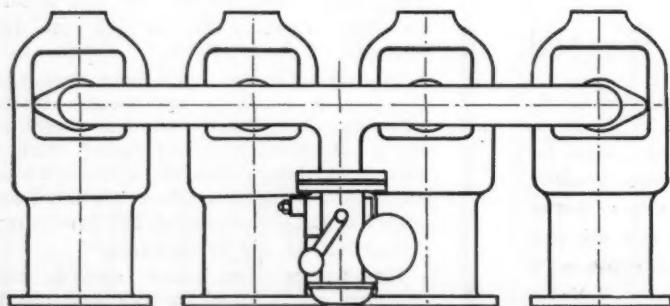


Fig. 3

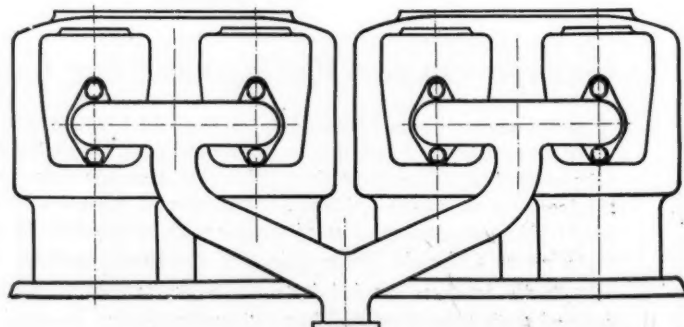


Fig. 4

Improved types of manifolds for four cylinder engines. These can be further improved as the long, unheated pipe offers a large condensation area

count of the less abrupt bends which minimize pocketing.

This makes for a fair uniformity of velocity throughout the length of the manifold, as the gas particles are swept steadily onward without anything to arrest their motion. It is at low temperatures that these types of manifolds show to best advantage for the reason that the gas is held at a fairly uniform, though not high temperature from carburetor to valves. Without doubt the best of the above mentioned systems is that illustrated in Fig. 9.

The advantage is that, the carburetor being bolted directly to the engine block, the length of the gas passages are reduced to the absolute minimum. An internal layout, suitable for overhead valve engines is shown in Figs. 10 and 11. It may be asked what value a knowledge of the latest developments in manifolding are to the mechanic when such systems as those last mentioned cannot be changed. Just this: If he is familiar with the latest practices and the reasons underlying them he will be qualified to advise his patrons regarding the advisability of altering the manifolds of the

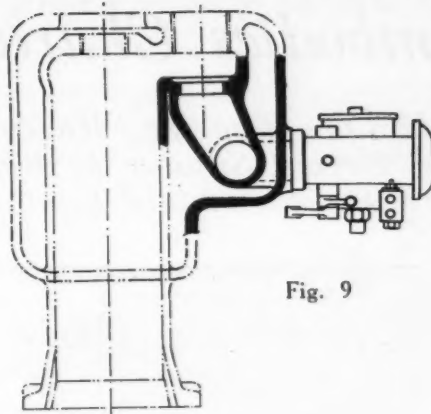


Fig. 9

The extremely short gas travel effected by the arrangement shown at the left is a close approach to the ideal. Right—Internal manifold of overhead valve engine

older models of engines to conform as nearly as may be to the shapes and temperature control features of those forms which have proven to be most efficient.

The next chapter of this series will appear in the August 18 issue.

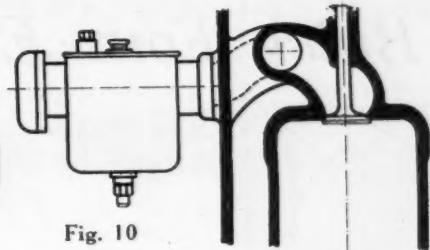


Fig. 10

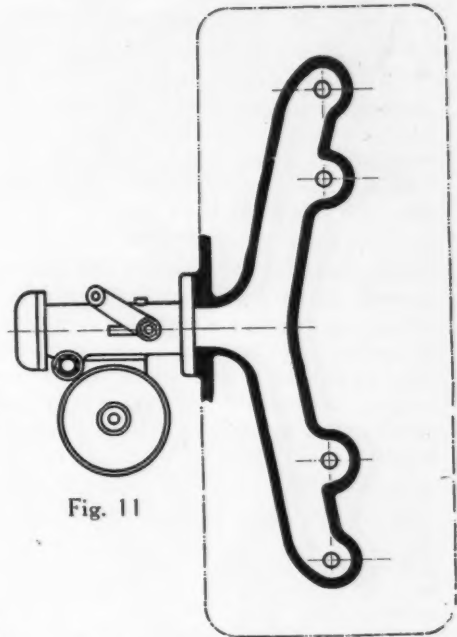


Fig. 11

Latest European Manifolding Practice

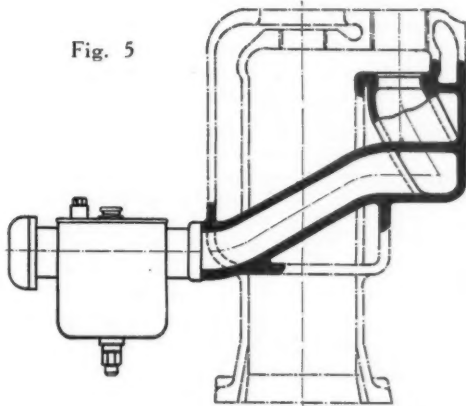


Fig. 5

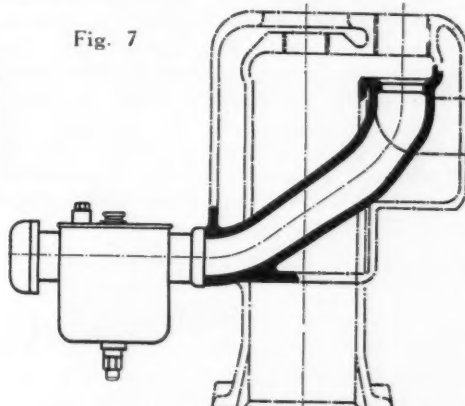


Fig. 7

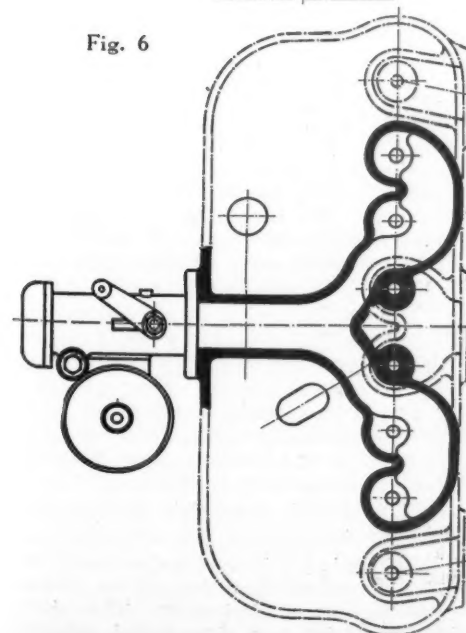


Fig. 6

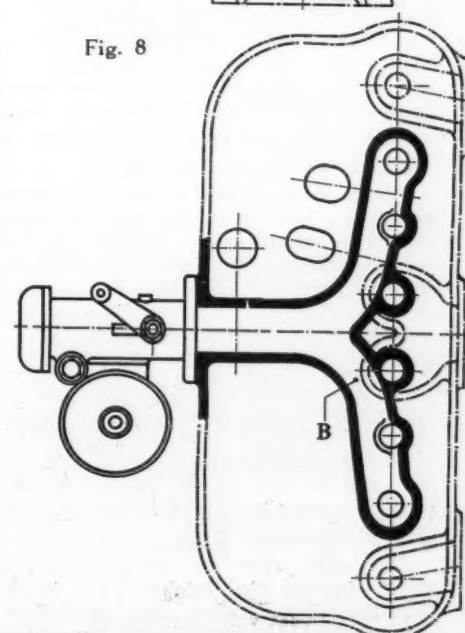


Fig. 8

Examples of internal manifolds—those shown in Figs. 7 and 9 are to be preferred

THE SERVICE MANAGER SPEAKS:

Continued from page 10

are to be delivered must be out of the shop and passed by the tester and delivered at the time promised to the sales department. Delay in delivery results in the loss of confidence on the part of the purchaser at the beginning of his relation with the organization, and in some cases causes cancellation of the order and consequent loss of time and effort on the part of all concerned in the sale.

Many women drive cars, and this fact presents another angle of the service to be rendered. A service station should have an attractive restroom for ladies' use, and feminine touches in it add greatly to its appearance and comfort. Floor service must not only be prompt and courteous, but the floor service man should have a clean duster coat to slip on at a moment's notice if he is to test a car. All cars should be wiped before delivery, running boards and steering wheel cleaned, seats brushed and wiped.

The entire organization, from the shop to the floor service, should recognize the importance of courtesy, gentlemanly bearing and willingness to serve in any capacity whenever the service station is visited by ladies.

The men who resolve to succeed make themselves recognized by the heads of the organization and gain the respect and friendship of the car owner. They add to the reputation of the service station and make permanent customers of the people with whom they come in contact. Upon such a foundation they build a lasting and successful business for the house and themselves.

J. Kemp Goodloe.

Buick Four Embodies Characteristics of Six

Body Styles Include Touring, Roadster, Sedan and Coupe. Valve Layout Similar to Buick Six Engine. Cord Tires Standard Equipment

ALL the characteristics of Buick practice are to be found in the new four-cylinder model recently announced. Body styles for the new model include a touring car, roadster, sedan and coupe. The chassis has a 109-in. wheelbase and the tire size is 31 by 4 in.

The overhead valve construction with detachable cylinder head is in accordance with up-to-date practice, which is further augmented by the adoption of a new automatically heated intake manifold and a particularly accessible layout, as far as maintenance problems are concerned. The model has brake horsepower of 35 to 40 and a shipping weight on the touring car of 2380 lbs.

In order to secure suitable performance, it is not necessary to utilize an excessive gear ratio. The final reduction is 4.6 to 1 for all models. This is the same ratio that is used in the five-passenger, six-cylinder car and less than is used in the seven-passenger touring, which is geared 4.9 to 1. This comparison, of course, must be taken into consideration with the fact that the tires on the four-cylinder are 31 in. in diameter and on the five-passenger six, 33 in., and on the seven-passenger six, 34 in.

The main body of the engine is a three-casting unit, the cylinder head, cylinder block and upper half of the crankcase being individual iron castings. The lower half of the crankcase, of pressed steel, forms the oil pan, and above the cylinder head is a stamped cover plate which houses the rocker arms and the remainder of the overhead valve mechanism.

VALVE CAGE CONSTRUCTION ELIMINATED

The four cylinders are cast in block and have a bore and stroke of $3\frac{3}{8}$ by $4\frac{1}{4}$ in. This provides an S. A. E. horsepower rating of 18.23 and a displacement of 170 cu. in. The cylinder block is a remarkably simple casting consisting only of the cylinder barrels and water jacketing for the upper part of the block. The manifold and valve guide retainers are cast in the cylinder head. The valve cage construction has been eliminated and the valves instead are contained directly in the head operating in pressed-in guides.

The cylinder head casting is also cored for water spaces around the spark plugs, valves and manifolds. The piston is cast-iron and is of the three-ring type with all three $\frac{3}{16}$ in. rings located above the

Specifications of Buick Four

| | |
|------------------------------------|--------------------------------------|
| Wheelbase | 109 in. |
| Tires | 31 by 4 in. |
| Engine bore and stroke | $3\frac{3}{8}$ by $4\frac{1}{4}$ in. |
| Horsepower (S.A.E.) | 18.23 |
| Clear diameter inlet valve | $1\frac{1}{8}$ in. |
| Clear diameter exhaust valve | $1\frac{1}{8}$ in. |
| Oiling system | Circulating splash |
| Cooling | Pump |
| Clutch | Dry-disk |
| Springs | Semi-elliptic |
| Price, touring | 935 |
| Price, roadster | 935 |
| Price, sedan | 1,650 |
| Price, coupe | 1,475 |

wrist pin. Below the bottom ring there is a wider groove so designed that it will pick the oil off the wall of the cylinder and lead it to the wrist pin bearing. The wrist pin bearing is located in the upper end of the connecting rod and the piston pin is offset $\frac{3}{32}$ in. towards the camshaft, this being identical with the practice followed in the six-cylinder model. The diameter of the piston pin is $\frac{3}{4}$ in.

CAMSHAFT DRIVE BY HELICAL GEAR

The entire valve layout for this engine is similar to that on the Buick six. The camshaft drive is by helical gear. The cam followers are of the roller type acting against push rods which carry a mushroom shaped spring retainer at the lower end. The tappet guide contains a coil spring which assists in the function of keeping the roller follower in close contact with the cam and acts as an auxiliary to the valve spring.

The push rods have a ball and socket connection at the rocker arm or upper end with an adjusting means fitted on the threaded portion of the rod at the upper extremity. The ball has a hardened and ground surface to eliminate wear. The rocker shaft is supported on the cylinder head, the rocker arms bearing with a rocking chair motion on the upper end of the vertical, overhead valve stem. The valves are directly in the head and are accessible for grinding, etc., and removal of the head is accomplished readily by taking off the cylinder head stud nuts.

The valve stem is characteristically Buick—having the intake valve larger than the exhaust valve. The clear diameter of the inlet valve is $1\frac{1}{8}$ in. and of the exhaust valve $1\frac{1}{8}$ in. These are

larger valves than those employed in the six-cylinder car, although the displacement per cylinder is very closely the same. The valves for the six are $1\frac{1}{8}$ in. for the inlet and $1\frac{1}{4}$ for the exhaust. The valve lifts for the new four-cylinder engine are $\frac{21}{64}$ in. for the inlet and $\frac{5}{16}$ in. for the exhaust, both exhaust and inlet have the same stem diameter of $\frac{3}{8}$ in.

The material of the inlet and exhaust valve head is cast iron and of the stem, carbon steel. The valve spring pressure is 76 to 85 lbs., this being the same that is employed on the six-cylinder car. The valve timing is also identical with the six, the inlet opening being 22 deg. 10 min. after upper center and closing 45 deg. 10 min. past lower center. The exhaust opens at 53 deg. '0 min. before lower center and closes 9 deg. 10 min. after upper center. The firing order is 1-3-4-2. This firing in conjunction with a 74 lb. per sq. in. gage compression pressure, indicates the high speed characteristics of the engine. The early opening of the exhaust valve, namely 55 deg. 50 min. before lower center, is particularly characteristics of the up-to-date type of high speed engine and is about 8 deg. earlier than the average timing for passenger car engines.

Oiling is by circulating splash system, the gear pump being located in the oil pan and driven directly from the camshaft. The pump is so constructed that it may be dropped out vertically for cleaning or inspection and is entirely exposed to view when the bottom pan is dropped. The capacity of the oiling system is 4 qts.

SEPARATE INTAKE MANIFOLD

The gasoline system comprises a 10 gal. cylindrical tank mounted at the rear of the chassis beneath a sheet steel cross-member from which the gasoline is drawn to a vacuum tank on the dash and fed by gravity to the $1\frac{1}{4}$ in. Marvel carburetor. The carburetor is a top outlet type mounted on a separate intake manifold. The diameter of the intake manifold at the throat is $1\frac{3}{32}$ in.

The cooling system comprises a square cellular radiator having a water capacity of $3\frac{1}{4}$ gal. and a radiating surface of 304 sq. in. It has a depth of $2\frac{1}{2}$ in. and is fed by a centrifugal water pump driven off the generator shaft. Cooling is assisted by a 16 in. three-bladed sheet steel fan driven by a $1\frac{1}{4}$ in. flat belt.

The clutch is a multiple dry-disk type, having eight blades. The size of the facing rings is $5\frac{1}{8}$ in. internal diameter and $7\frac{1}{8}$ in. overall diameter, giving a total surface area of 148.4 sq. in. This delivers the drive to a three-speed, selective sliding gear transmission mounted as a

unit powerplant. This is an orthodox type of gearset.

The bearings in the transmission gearset are New Departure on the main shaft and plain bearings on the countershaft. The front main transmission bearing is a 1209 New Departure and the rear main bearing of the transmission is a No. 1306 New Departure.

The remainder of the drive consists of a $1\frac{1}{4}$ in. solid propeller shaft with two universals. The front universal joint is directly connected to the rear end of the transmission gearset and has an automatic oil level allowing it to be lubricated directly from the gearbox. The rear axle is a three-quarter floating type with a malleable iron housing. The final drive is through spiral bevel gears the reduction being provided by 42 teeth in the ring gear and nine in the driving pinion. The bevel pinion shaft is mounted on two New Departure bearings, the front being a No. 306 and the rear a No. 1308.

SEMI-ELLIPTIC SPRINGS USED

The suspension of the car is on semi-elliptic springs, the rear spring being $55\frac{1}{2}$ in. long and 2 in. wide. The front spring is 36 in. long and $1\frac{3}{4}$ in. wide. The spring eyes are all bronze bushed and provided with the Alemite attachment, this type of lubrication being utilized throughout the chassis. The brakes are external and internal on a common drum located on the rear wheels. The drum diameter is 11 in. and the width $1\frac{3}{4}$ in. The steering is a Jacox, screw and nut design.

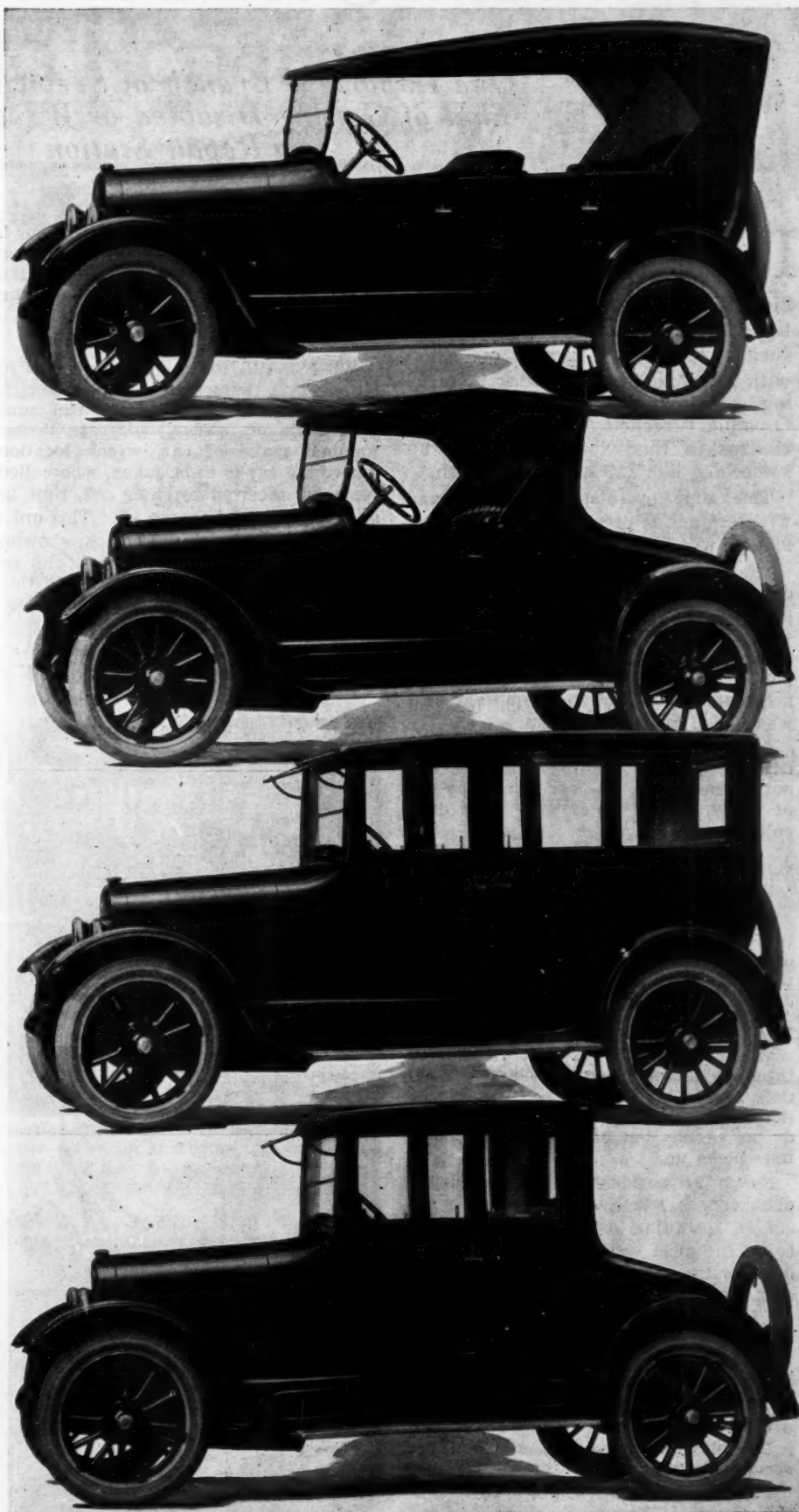
Electrically, the car is completely Delco, the distributor is in unit with the generator and the starter reduction 23.8 to 1. The generator speed in relation to the crankshaft is 1.5 to 1. The battery provided is an Exide, three cell type with a 6-8 voltage. The head lamp candlepower is 21 and the dimmer is regulated by a coil on the switch.

All of the bodies are of the low hung type giving the impression of length to the cars. Inspection of the body makes it difficult to believe that the wheelbase on this chassis is only 109 in. A turning radius of 36 ft., however, is secured with this short length.

The upholstery on the open models is of genuine leather for the seats and backs, and on the closed models a rich worsted material is standard. The closed cars are equipped with adjustable windshield visors, a windshield cleaner, dome light, ventilating windshield, adjustable windows and sun shades for the rear windows. All models are equipped with non-glare headlight lenses and are provided with a tire carrier and extra rim.

On the touring car, as an example of the seating allowance, the inside seat width in the rear is 46 in. and the front 39 in. Prices of the entire line f. o. b. Flint, Mich., are as follows: Two-passenger roadster, \$935; five-passenger touring, \$975; three-passenger coupe, \$1475; five-passenger sedan, \$1650.

Four-Cylinder Models Which Buick Adds to Line



The touring car is a five-passenger, the roadster a two-passenger, the sedan a five-passenger and the coupe a three-passenger. The standard color is black with a white stripe around the deckline on the open models

Hauling in the Remains

One Important Branch of Service Work Is That of Getting Disabled or Wrecked Cars to a Repair Station

IN spite of the many efficient methods inaugurated by the city of Detroit to prevent motor accidents, motorists in that city continue to make junk of their cars at such a rate as to furnish one shop with an abundance of work in picking up the remains. This concern, the Olympic Wrecked Auto Service, specializes in this work and picks up something like 250 wrecks a month.

This shop operates five Nash Quad wreckers and is prepared to pick up any kind of wreck.

The wreckers have a four-wheel, direct drive truck with a power take-off which operates a winch capable of lifting 35,000 lbs. It is equipped with two pairs of extra wheels and axles, so that in picking up a wrecked car they can, if necessary, mount the wreck on their own wheels and haul it anywhere.

One of the illustrations shows the Olympic wrecker, pulling a Ford Sedan out of the river. The car was lifted out of thirty feet of water with little difficulty.

NIGHT IS BUSIEST TIME

It would be naturally surmised that there would be far more traffic accidents during the day than at night because of the fact that there is far more traffic during the former period—but such is not the case.

"Our busy period is from midnight to three in the morning," declares E. W. Cole, service manager of the Olympic station. "During the day we have little to do, as a rule, but about midnight business picks up."

Nearly all accidents are caused by drunkenness, carelessness, or bull-headedness, according to Cole, the first-named being the most common source of business for the wreckers.

The Olympic also gets a large amount of business at night that would be handled by regular service stations if the breakdowns occurred during the day. Many service stations do not operate at night, so that calls for tows are turned over to the Olympic company, which makes the hauls and collects from the service station.

The Olympic station takes care that the owner is not overcharged for the service by mailing him a postcard on which he is informed that on a certain date the company hauled his car to a certain service station and that the

charge was a certain sum. The owner is asked to notify them of any overcharge or discourtesy. At the bottom of this card the rates of the Olympic wrecking service are given and the recipient is asked to preserve these.

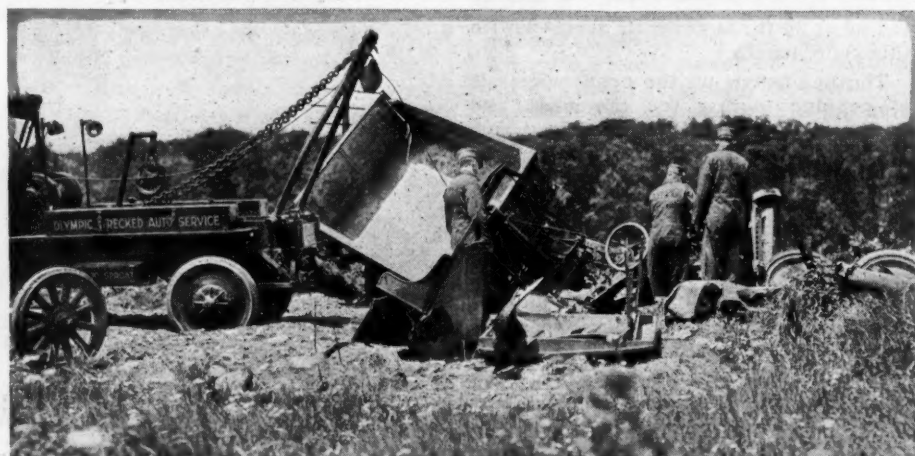
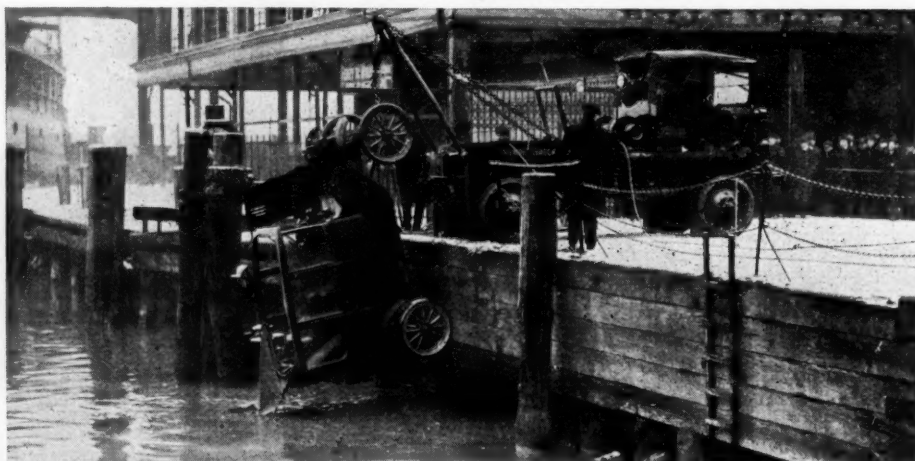
When a call for a wrecker comes in, a blank is immediately made out in triplicate, showing: the date, run number, name of owner, address, license number, make of car, wreck location, where the car is to be taken, who called, remarks, received by, time out, time in, driver, amount of charge etc. This order is stamped in an electric clock, showing the exact time the wrecker left and returned. One copy of the order is then filed under the heading of make of car,

another according to the number of job, and the third is held until the bill is paid.

The Olympic company also rebuilds wrecked cars, about 70 per cent of the wrecks picked up being left for rebuilding. All rebuilding is done on a straight contract basis. The car is carefully inspected and a list of repairs and new parts made, then the owner is told just exactly what the job will cost. As the majority of jobs consist of complete rebuilding of cars, these costs usually mount up to several hundred dollars.

Employees wear uniform overalls on the back of which appears the name of the company, and the wreckers are conspicuously decorated with advertising matter.

Wrecking Truck in Operation



Some typical instances wherein the wrecking truck is called upon to get in its work. One wrecking concern in Detroit maintains the services of a diver for river work

Practical Tire Merchandising and Repairing

by Stanley P. McMinno



Making the Tire Repairshop Efficient

*Damp Cellars Are Objectionable
Upstairs Location Is Preferable
Get Good Light and Air
Separating Shop and Store
Arrange Equipment for Efficiency*

*Route Work Through Shop
Wall and Center Benches
Provide Adequate Tool Space
Locating Vulcanizing Equipment
Cover All Supply Pipes*

THE ideal location for the tire repairshop is on the same level with the salesroom, and preferably behind it, as outlined in a previous chapter. In some cases, however, it may be desirable or expedient to locate the shop elsewhere, and where this is done there are certain precautions that should be taken to avoid inconvenience and to insure the good quality of the work turned out.

Where rents are high it has always been a favorite plan to place the repairshop in the cellar. If the cellar has a high ceiling and can be well lighted and ventilated with side windows, the plan has few disadvantages.

DAMP CELLARS ARE OBJECTIONABLE

If the cellar is damp this condition will be hard on the workmen and will affect the quality of the work for the reason that the cement will not dry properly unless allowed to remain a very long time.

If the cellar has a heater in it, on the other hand, the temperature is likely to be too warm for the workmen and there is danger of the cement drying too quickly.

Cement normally dries to the proper consistency in two or three hours. If it is hurried because the temperature of the room is too high, a thin skin is formed on the top leaving liquid cement underneath. This causes boils and blisters and porosity when the job is vulcanized.

The net result obtained in allowing the cement to dry is the complete evaporation of the solvent which may be benzol, gasoline or Energine. When the solvent has evaporated it leaves raw rubber and it is this rubber that effects the adhesion between the old rubber in the tire and the new rubber that is used for the repair.

It follows, therefore, that if the repairshop is located in the cellar it is important to provide for good natural light and ventilation. The cellar must not be damp nor must the temperature

Ask Us!

ASK US!

This series has been made intensely practical in nature, FOR YOU.

It is for you to use, to put to work. But there may be some points in the articles you do not thoroughly understand.

ASK US!

We're here to answer. We want these articles on tire repairing and merchandising to be of the

GREATEST POSSIBLE VALUE!

Ask as many questions as you like. Ask any kind of questions. The Editor will answer them.

be allowed to go much above 60 deg. Fahr.

Artificial light is unsatisfactory. Better work is always done under natural lighting conditions. Incidentally, if the cellar is so dark it must be lighted by some artificial means, the lighting bill may be prohibitively high.

UPSTAIRS LOCATION IS PREFERABLE

One disadvantage of the cellar location is the difficulty of getting large size casings from the salesroom to the shop. This difficulty increases with the size of the casings and where the volume of work on pneumatic truck tires is considerable, a cellar location may be entirely out of question solely because of the labor required and the time lost in getting jobs down into the cellar and dragging the finished work up again.

It is a far better plan to place the repairshop on the floor above the salesroom, if possible. Such a location, of course, has the same disadvantage as

has the cellar location when it comes to handling heavy casings, and this should be borne in mind particularly if the stairs are narrow or steep so that there would be unusual difficulty in taking casings up or down.

Difficulty of that kind could sometimes be overcome by the use of a small elevator, but if any considerable number of truck pneumatics were being handled, the elevator would have to be so large that the expense of installing it would probably be too great. The ordinary apartment house dumb-waiter would not be big enough to handle any but Ford tires.

GET GOOD LIGHT AND AIR

An upstairs location automatically provides good ventilation and good light, particularly where the business is in a corner location so that advantage can be taken of both front and side windows.

Another advantage of the upstairs location is that if the equipment of molds is extensive and requires the use of a separate boiler it is generally possible to utilize a corner on the salesroom floor for the location of a boiler with the pipes running through the flooring to the mold equipment.

In this way there will be no difficulty in providing the proper drainage which is so essential, between the molds to the boiler.

Obviously, if the shop is above the salesroom there will be no suggestion of dirt or confusion in the salesroom nor will there be any odors from any burning rubber, or rubber in the course of vulcanization.

SEPARATING SHOP AND STORE

A third alternative method of locating the repairshop, and a method that has been worked out to considerable advantage in a number of places, is to separate the salesroom entirely from the shop, the latter being perhaps in another building and very likely on another street.

This has been done where ground rents have been too high to allow a shop in combination with the salesroom. In

the case of a prominent down-town location, for example, a small store would serve as a salesroom and might also be used as a pick-up point for repairwork.

In other words, customers need not know anything about the shop or its location. They merely bring their repairwork to the store and from here it is transferred daily or perhaps several times a day, to the shop, the finished work being brought back on the return trip.

This plan has the obvious disadvantage that there is no very close contact between the store and the shop. It would require a very rigid adherence to system, in order to insure customers' having the work when told to call for it and to avoid the possibility of their calling for work before it is ready for them. A system of the kind is outlined in a later chapter.

Where store and shop are separated it is entirely possible to arrange that customers leaving repair jobs, call for them at the shop, although this plan should be discouraged unless other arrangements are impossible. It will get the customers into the habit of running to the shop, and it may be more desirable to have them come to the salesroom both because of appearances and because of the possibility of selling them something there.

ARRANGE EQUIPMENT FOR EFFICIENCY

The arrangement of the various pieces of equipment in the tire repairshop, such, for example, as tire changer, tire spreader, repair benches, vulcanizing molds, etc., is of the greatest importance and will have a very definite bearing on the amount of work turned out and on the quality.

On every side we see industrial plants laid out and arranged for efficiency and for the elimination of waste motion, so that every working minute is utilized and lost time is reduced to the minimum. High-priced engineers are employed for the purpose of locating equipment and properly routing work. If the expense of all this effort is worth while in every other industrial plant, it is certainly worth while in the tire repair plant.

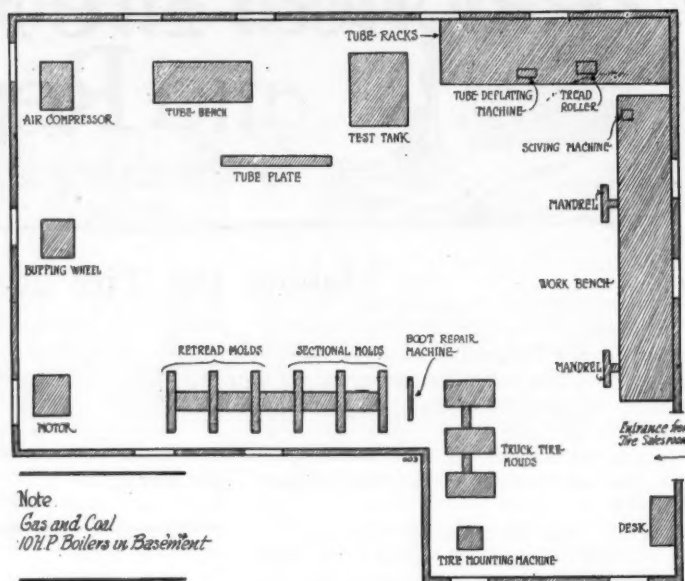
Principles remain the same regardless of the size of plant or the nature of the work on which it is engaged. They are applied with equal facility to enterprises of every size from the smallest to the very largest.

Obviously, workmen must have room to work—they must not be hampered by placing equipment too close together. On the other hand, they must not be subjected to the handicap of having to walk further than is necessary to go from one piece of equipment to the next.

ROUTE WORK THROUGH SHOP

The first principle of efficient lay-out is to route the work properly through the shop. In other words, it is not well to have the vulcanizer near the door through which tires or tubes first reach the shop because vulcanizing is one of

The first principle of efficient lay-out is properly to route the work through the shop. This shows an efficient arrangement, the shop being directly behind the salesroom



the last jobs to be done before the work is returned to the customer.

Probably the first job will be to take the tire off the rim and for this reason the rim machine, if one is used, should be placed near the entrance to the shop. After the tire is taken off the rim, the next job very likely will be to examine the casing; therefore the tire spreader should be the next in the line of equipment.

The next operation will probably be to test the tube and so we must have the tube testing tank not far removed from either the rim machine or the tire spreader. The tank should preferably be located in a window where maximum light is obtainable and small leaks can be located with the least loss of time.

It follows that after the leak has been located, the tube will be placed on a rack ready for the workman and this means the rack should be close to the tube testing tank.

The workman will probably then return to the tire spreader, mark any repairs necessary in the casing and place the casing in a rack; this rack therefore should be close to the tire spreader. The rim and flap next require attention and racks for rims and a filing system for flaps should be provided near the rim machine.

In general, wall space is best utilized for bench location unless the shop is a large one with quite a number of workmen, in which case it may be more expedient to place the bench in the center, so men can work on both sides. This plan leaves wall space clear for tire, rim and tube racks and perhaps for the vulcanizing mold equipment.

If the bench is placed in the center, the walls on each side are most naturally used for drying racks. This makes it very easy for the workman to transfer work in process from the racks to the bench, or vice versa. If such an arrangement is used the back wall at the

end of the bench is probably the best place for the vulcanizing mold equipment as it is then equally accessible to men working on each side of the bench.

PROPER WIDTH OF BENCH

The width of the bench is very largely a determining factor in the speed with which work can be turned out. If the bench is placed in the middle of the room, racks should be built in the center of the bench to hold rebuilding fabric and the various kinds of repair stock so that these materials are easily reached by workmen on both sides.

The bench must be wide enough to allow needed room for cutting fabric, but it must not be so wide that repair materials are difficult to reach. It has been found that the most effective width is approximately 60 inches. This will give plenty of room for all ordinary fabric and tread stock cutting without making it unnecessarily hard for the workman to reach the materials.

If the shop is small enough so that the requirements can be fulfilled by a single bench along one of the side walls then the width should be slightly more than half the width of the double bench, or about 36 inches.

DETERMINING BENCH LENGTH

The length of the bench is not of great importance except insofar as space requirements are concerned. In order to work efficiently and have plenty of room a single workman should be supplied with a bench not less than 10 ft. long. Two workmen will require not quite double this space because they will probably use some tools and equipment in common so that a certain amount of space may be saved in this way.

In determining the length of the bench it should be remembered that there are certain pieces of small equipment that can be placed on it to greater advantage than anywhere else in the shop. This refers particularly to such tools as a small hand-operated grinder for sharp-

ening rubber knives, the tube deflator, the valve removing tool, etc.

All of these pieces of equipment can very easily be placed on the end of the bench where they are handy for all workmen and do not obstruct the space used for tire building.

PROVIDE ADEQUATE TOOL SPACE

Some place should be provided on the bench for tools and also for valves and valve parts. If a central bench is used it is best to provide a compartment for tools under the fabric racks. This can be done by enclosing in molding nailed to the bench, a space the length of the racks and about 10 or 12 in. wide. Valves and valve parts will probably be kept on a shelf under the bench where they are out of the way and easily accessible.

The tool space on a side bench can be put under the fabric rack in the same way or can be put just beside it in a series of shallow compartments or shelves built against the wall. Similarly, valves and valve parts could be put on similar shelves or could be stored in compartments under the bench.

Regardless of the disposition of such tools and parts, however, the important consideration is to have a place for everything and to keep everything in its place. A great deal of time is lost by workmen hunting for tools unless those tools are in plain sight and within easy reach.

LOCATING VULCANIZING EQUIPMENT

The vulcanizing cavities, tube plates and inside sectional arms, kettles, etc., are the most important pieces of equipment in the shop, and every bit of thought devoted to their arrangement and location will be well worth while.

If the business is an established one, its requirements will have been fairly well outlined and will serve as a guide in placing the various pieces of equipment. But whether the business is new or old, it is well to bear in mind certain cardinal principles which have been determined by the experience of various manufacturers of vulcanizing equipment and by tire repairmen operating under various conditions all over the country. Proper understanding of these principles requires no knowledge of engineering; their application comes very largely from the use of the common variety of horse-sense.

VULCANIZERS AT SIDE OR END

For example, it would be foolish to place mold equipment in the center of the room because it is always approached on the side from which the work is done and never from the other side. Therefore, wall space is best used for such equipment.

If self-contained equipment is used, the height of the molds from the floor is unchangeable and therefore correct; but if separate mold equipment is used with the various molds mounted on a single bench or a series of benches, the height can be made whatever desired by the person laying out the shop; how-

ever, only one height is correct. The bottom of sectional cavities should be very closely 24 in. from the floor. This allows easy insertion of casings with their air bag and bead mold equipment, and simplifies their removal.

Increasing the height of the molds requires too much lifting, and if the molds are very much lower, the operators are compelled to work in an unnatural condition, which is tiring, and, in turn, productive of poor results.

It goes without saying that vulcanizing equipment must be kept away from passages and doorways, not only to prevent interference with the work but also as a safety-first measure, so that workmen or others will not be accidentally burned by the molds or exposed piping.

PROVIDE ROOM FOR WORK

The distance that molds are placed from the walls will be determined by the size of the casings to be vulcanized. Molds for large truck tires, for example, will have to be further from the wall than will those for the ordinary sizes of passenger car tires.

In general, it is best to keep sectional molds at least 18 to 24 in. from the wall. These distances may seem excessive at first but it should be remembered that occasionally a tire will stick in the mold and will require the efforts of two men to remove it, one at the front and one at the back, and there must be room enough for both of them to work.

There are two types of equipment that can be used, the self-contained type in which the boiler and molds are combined, and the individual bench type in which each of the various sizes of molds and pieces of equipment is separate and heated by a single large boiler.

Each type of equipment has certain advantages and disadvantages which are taken up in detail in a later chapter; but regardless of the type of equipment purchased, steam is the most widely used heating element and for this reason it is well to have some understanding of its character and the reason for its use.

COVER ALL SUPPLY PIPES

Loss of heat through the pipes can be overcome to a certain extent by covering them with asbestos. This will also serve to prevent workmen being burned. Another frequent cause of the poor work which results from low temperatures is caused by piping that is too small, or by improper drainage. Water collects in low spots and thus prevents proper steam circulation.

The main steam supply pipe from the boiler to the molds should not be less than 1½ in. in diameter and should invariably be covered with asbestos. Outlets from this main to the various molds can be reduced to ¾-in. and then to ½-in. where they enter the vulcanizer, although it is better if possible to continue the ¾-in. diameter direct to the mold.

Some manufacturers recommend that the main supply pipe be ¾-in. diameter with ½-in. leads to the various equipment. It is quite possible to get along

with these sizes of pipes but the larger diameters will be more satisfactory and will lose less pressure and heat.

The return line need not be larger than ¾-in. in diameter but should be laid out with great care to be sure that proper drainage is obtained and there is no possibility of water traps developing.

Obviously, no piping should be longer than is absolutely necessary. This applies more particularly to the supply lines.

CHARACTERISTICS OF STEAM

When water is heated to the boiling point it is evaporated into steam. The steam directly above the water in the boiler is what is called "saturated" steam and its temperature is 212 deg. If this steam is confined, the pressure within the boiler increases and the steam absorbs more heat from the boiler and becomes what is known as "superheated" steam. Such steam still contains a considerable amount of water.

From this it should be clear that the temperature of the steam bears direct relation to the pressure in the boiler. Herewith is a table showing the relationship between the various pressures and temperatures.

TEMPERATURE OF STEAM AT VARIOUS GAGE PRESSURES

| Lbs. | Fahr. | Cent. |
|------|-------|-------|
| 20 | 228 | 108 |
| 24 | 238 | 114 |
| 30 | 251 | 121 |
| 34 | 258 | 125 |
| 40 | 267 | 130 |
| 44 | 273 | 134 |
| 50 | 281 | 138 |
| 55 | 287 | 141 |
| 60 | 293 | 145 |
| 70 | 303 | 151 |
| 75 | 308 | 153 |
| 80 | 312 | 156 |
| 90 | 320 | 160 |
| 100 | 328 | 164 |

This table is accurate only under ideal condition and the difference between pressure and temperature may vary considerably.

For example, the temperature at the molds may be quite considerably less than the temperature in the boiler, due to radiation from exposed piping and from the vulcanizing molds. Therefore, the table cannot be used except to indicate what the approximate mold temperatures should be with corresponding boiler pressures.

The only accurate means of determining the temperature at the mold is to use a thermometer.

In next week's article Mr. McMinn will cover the following points: The Three-Cavity Machine; Use of Reducing Shells; Separate Tube Plate Desirable; Approximate Operating Cost; Make It Easy to Expand.

In future articles he will discuss: How to Test Tubes; Perfect Cleanliness Is Essential; Benzol Is Best Cleaning Agent; Simplest and Quickest Way; Using a Rubber Rivet; Approximate Curing Time.



EDITORIAL



Stock Car Competition

PUBLIC DEMAND, coupled with the desire of some manufacturers and distributors, seems to be bringing back the old-time demonstration and endurance races for stock cars. The object of these races, of course, is two-fold: first, to bring home to the public mind the performing ability of the automobile, especially the stock car; and, second, to stimulate improvements in construction and mechanical design. On the Pacific coast particularly there is manifest an appreciable revival in interest in racing, and large crowds greeted the finishes of the races at Tacoma, Seattle and Reno this year.

The building and opening of speedways on the coast also indicates the revival of interest in racing. Los Angeles pioneered the way with such a track; Tacoma has had one for some time; Fresno has a good racing bowl, and, on Aug. 14, northern Californians will have their first opportunity to see the stars of racing in action in the new bowl at Cotati.

So far as stimulating the development of cars is concerned, it is doubtful whether stock car racing is going to be counted upon or participated in by any large number of car makers in this country. Of course, some years ago, when heat treatment of steels, the I-head engine and disk clutches were being developed, stock car racing did much for the makers. But the chassis of today is so well standardized and so tried a product that little is left to be done in the way of improvement which cannot be worked out in the laboratory or in a test chassis on the road.

Racing as a sport is expensive, and so long as the multitudes of sport lovers can get their thrills from the special racing cars which have featured the tracks during the last few years, it is not likely that stock cars with their slower speeds would offer much inducement for drawing a crowd. Such events as the Glidden tour, the run around Lake Michigan, and other endurance runs were staged in the days of spring breakage, stripped gears and short-circuited coils, and in those days constituted virtually an outside laboratory for makers and dealers alike. It was an achievement to come through with a clean score. But today we expect the average motor car to negotiate such a trip as a matter of course. Motor car improvement has been rapid, and whether or not the staging of stock races and runs would result in further benefit is conjectural.



Give Used Cars Fair Show

WITH the used car situation approaching "white elephant" proportions in the United States and with a drift-over-the-border movement so strong that used cars of most every make may be bought cheap-

er in Mexico than in the United States, it is not a misdirected effort on the part of any one to try to place a thumb on the main cause contributing to such a condition.

There are as many reasons for a dealer coming into possession of a used car as there are used cars on the salesroom floors, but these innumerable little whys and wherefores do not seem to be responsible for the great number of cars responding to a census of store and salesrooms. It seems to us that the real cause for there being so many second-hand cars in the possession of dealers lies in faulty sales policies and practices in the used car market.

Excepting in rare cases used cars are not given a fair show. They will move more rapidly and in greater volume if they are displayed in more commodious, cleaner, better lighted and better furnished salesrooms. So often the traded-in car is packed away in some back room or is placed in the service department. These rooms are unkept and dark. A prospective customer for one of them is led back past cars that are being repaired. Tools and waste are strewn on the floor; odors of oil, gas and paint fill the air. The car does not look near up to the price asked.

The customer is forced to think the used car has greatly depreciated in value because of the environment in which it is placed. Move the same car into light, well furnished quarters and increased value at once attaches to the product. To paraphrase an old saying, "the used car is no brighter than its darkest surroundings," and the dealer who tries to sell cars from amidst waste, grease and noise depreciates the force of his salesman and the value of his merchandise. If light airy rooms are conducive to sales for new cars that will shine in the dark, the same class of quarters are equally necessary for the sale of cars that have had the shine worn off them.

And again, dealers should at once begin to establish the reputation of not allowing any used car to leave their establishment in a defective condition, no matter what the price may be. Every buyer of a used car is a prospect for a new car. If the dealer sells a used car that gives immediate trouble he is more than likely damned in the mind of the buyer, regardless of the conditions under which the car was sold. See that every car sold is in good running order and the buyer who finds it so will some day come back for a new car from the man upon whom he has learned to depend; in the meantime, other buyers of used cars will have followed the advice and example of the satisfied buyer and bought cars from the man who made dependable every machine that left his place.

Many New Models Will Keep Up Fall Production

Ford Motor Co. Emphatic in Its Denial That New Car Is to Make Appearance This Fall—July Generally Shows Increased Sales Over June

DETROIT, Aug. 9—Many of the factories in the Detroit district are planning new models for appearance in the late summer and early fall months but the Ford Motor Co. will not be one of these. Emphatic denial from the Ford company today states:

"Our attention has been called to recent newspaper articles to the effect that there is to be a new model Ford car on the market Aug. 15 with change in design to a ventilating windshield and one-man top. As we do not contemplate any such changes and there is no foundation to the rumors circulating in this connection, we have no hesitancy in making a denial of the report."

Columbia Motor Car Co. will present its 1922 models on Aug. 15. The new line will embody many new features and is designed to meet the demand for cars along sport lines. New prices will be announced in connection with the new line.

Liberty Motor Car Co. is bringing out a new sport model car which will soon be ready for delivery. Some of these cars are already moving though the price has not been definitely fixed. This will be announced when general delivery starts.

Maxwell will meet the demand for cars of greater wheelbase and generally improved appearance by changing its line to a larger vehicle. Necessary changes in equipment are now being made at the factory and by early fall the company will be in production on the new models solely.

Production in a majority of Detroit plants for July shows a general increase over June and schedules for August show a continuance of the present aggressive policy.

Ford Motor Co. closed the month with a total production of 107,132, about 5 to 6 per cent of which was trucks. This was slightly under the schedule outlined, due to manufacturing circumstances only. In August the company is adhering to its 109,000 schedule. There is no curtailment in sight. Sales are running as far in advance of production as formerly.

Studebaker is running to capacity. July production totaled 8,100 in all models which is as many as the company can build. August will witness the same

New Models To Feature Fall Selling

THE Ford Motor Co. will not be among the many manufacturers to enter the late summer and early fall market with a new model, despite the fact that the rumor of a new Ford has been given broad circulation. Fall business is expected to reach high marks under the impetus to be given sales by the appearance of new models from a large number of makers.

With July production schedules met, and in many cases, passed, manufacturers in the Detroit district have entered August with bright prospects. New dealers have been assigned in many lines and with prices stabilized future business in the automobile industry seems promising indeed.

amount of business. Unfilled orders under present schedules cannot be brought down at all is the word at the factory.

Buick is going to build 11,750 cars in August which total includes both the new Four and the former models. The production will be within 250 of the biggest monthly production the company ever had. July production ran between 9,000 and 10,000 which is big business.

Hudson-Essex in July ran at about 60 per cent of its 1920 business. Sales are holding up well, is the factory statement and while conditions are admitted peculiar the companies are confident of plenty of business ahead.

Cadillac business is running at the rate of 80 to 100 cars a day. Production in July was slowed somewhat owing to moving operations from the Woodward Avenue plant, which are now completed. With all equipment installed the company will devote all of its labor in August to car production. Sales outlook is considered especially bright.

Maxwell and Chalmers produced 1,085 and 257 cars respectively in July. With Maxwell this represented an increase from 878 in June. Chalmers showed a falling off. Production in August will be

based upon business conditions and will adhere to approximately the same rates as shown in July.

Packard business in July showed an increase in Twin Six business ascribed at the factory to the reduction in prices. Single six business approximated that of June production and will continue at the same rate in August. The factory reports little business in trucks.

Oldsmobile business ran at about 70 per cent of normal capacity. Production in August will be at about the same rate as in June and July.

Dort reports business in July as running at about 1,500 cars and looks for an excess of about 500 in August. In making comparisons, Mr. Dort, president, declares business is running in excess of 1919 which was considered a busy year. The company declares business best in big industrial centers.

Hupmobile in July turned out 1,925 cars, 175 more than in June. The outlook for August is satisfactory and schedules will be continued along present lines.

Columbia business in July approximated 60 per cent of normal figures, this keeping up with the June rate. Much larger business is looked for in August owing to the appearance of the new models.

Briscoe reports a marked improvement in July. Sales ran at about 50 per cent of normal and a 60 per cent rate is looked for in August. Many dealers and distributors were taken on by the company in July.

Liberty business bettered June by 25 per cent. Further improvement is looked for in August. The company's new sport car is making its appearance.

Paige reported July as its biggest month since April, about 1,200 cars being produced, which represented a 40 per cent increase over June. The company looks for good business in August based on early orders and contracts.

Saxon business in July ran 20 per cent better than June. The company's new line is making good headway and it reports greatly increased interest on the part of dealers. At present it is busy taking care of its distributors.

Wills-Lee is running along at the same rate reached following the introduction of the car to the trade. Sales are steady and good business is looked for in August.

Tire Mileage Guarantee Void Under Tax Loading

**Blow-Outs May Be Expected to
Follow Secretary Mellon's
\$10 Federal Fee**

CHICAGO, Aug. 5—If Secretary of the Treasury Mellon's recommendations to add \$10 yearly fee on each automobile and motor truck in the United States becomes part of the proposed revenue-raising law, Chicago owners alone will pay an aggregate tax to city, state and nation of \$5,551,256. At the present time this means an added tax of \$1,589,380 annually. Chicago owners have already paid to the city this year \$1,864,123 as a vehicle tax, with an amount above this as a state road tax. In addition to these taxes, there are 21,647 owners of automobiles and trucks in the city who have filed schedules with the board of assessors on which they have paid \$233,630 more as "property" tax.

If Secretary Mellon succeeds in getting his recommendations through Congress, Chicago owners will have a great deal more to pay than \$1,589,380, for the federal government is a better revenue collector than either city or state. The federal officers will be able to see many automobiles within the city that have gone undiscovered by both state and city assessors.

So far this year city officials have discovered and taxed 127,633 passenger cars, 27,347 trucks, 2767 motor cycles and 1191 automobiles used by dealers for demonstration purposes. On the other hand, the secretary of state has licensed 534,000 passenger cars and 60,000 motor trucks.

The proposed federal tax added to the city and state fees gives a tabulation on passenger cars and trucks as follows:

| PASSENGER CARS | | | | |
|-----------------|---------|---------|---------|---------|
| Hp. | State | City | Federal | Total |
| 25 or less..... | \$ 8.00 | \$10.00 | \$10.00 | \$28.00 |
| 25 to 35..... | 12.00 | 10.00 | 10.00 | 32.00 |
| 35 to 50..... | 20.00 | 20.00 | 10.00 | 50.00 |
| 50 or more..... | 25.00 | 20.00 | 10.00 | 55.00 |

| TRUCKS | | | | |
|-----------------------|---------|---------|---------|---------|
| Load wt., lbs. | State | City | Federal | Total |
| 5,000 or less..... | \$12.00 | \$15.00 | \$10.00 | \$37.00 |
| 5,000 to 12,000..... | 22.50 | 30.00 | 10.00 | 62.50 |
| 12,000 to 15,000..... | 35.00 | 30.00 | 10.00 | 75.00 |
| 15,000 or more..... | 60.00 | 30.00 | 10.00 | 100.00 |

MAKES APPEAL TO 10,000,000 OWNERS

Washington, D. C., Aug. 8—Appeal has been made by the American Automobile Assn. to 10,000,000 owners of motor vehicles to oppose the proposal of Secretary of Treasury Mellon for a \$10 flat tax on automobiles irrespective of power or size. Statistics have been sent broadcast showing that automobilists are already carrying more than their share of tax burden and that further advances in rates would be obviously discriminatory and iniquitous.

It is said that Chairman Fordney of the House Committee on Ways and Means is opposed to the Mellon proposal for a tax on automobiles because he believes cars of small power should not pay the same rate as larger cars and heavy trucks. The recommendations

of the treasury department have precipitated a bitter fight in Congress which is not confined to party lines. It is expected that representatives of agricultural districts where there are large numbers of motor vehicles in use will fight the enactment of a motor tax.

Because it is primarily a tax which hits the users of automobiles, the American Automobile Assn. is handling the movement against the Mellon measure

Horseshoes, T o a d- skins, Rabbits' Feet, Shamrocks!

SAN FRANCISCO, Aug. 6—Bert Latham, of Latham, Davis & Co., Inc., Stutz distributor here, tells a story at the expense of his sales force, which might point a moral for sales forces elsewhere.

Latham, by request, let all of his salesmen off for July fourth excepting George Regan, who was not one of those to ask the favor.

Regan spent the fourth in the office; the rest of the boys went away, but when the five gathered in Latham's office after the vacation, Regan put a fly in the ointment by remarking, casually, that he had sold five cars while his fellow-salesmen were away.

Then it developed that Regan had a theory about holiday trade in automobiles and stayed home to work it out. His theory is that if a three-day outing is possible for the city man, it also is possible for the out-of-town man or the farmer. Hence, if the city man goes to the country, it is likely that the country man will come to the city. This theory proved correct, for each of Regan's five sales was made to an out-of-town buyer.

but has the support of the National Automobile Chamber of Commerce and other large business organizations. Every automobile club in the country has been asked to bring pressure to bear on congressional leaders and with 10,000,000 automobile owners protesting, Congress is expected to give due thought to the possible economic and political effects of an automobile tax. Attention of House Committee on Ways and Means has been called to the fact that car owners are paying a multitude of taxes on their cars including registration fee, drivers' license fee, personal property tax, municipal franchise tax, motor fuel tax and other local assessments.

The excise taxes on automobiles will probably be maintained.

RACING AT QUAKER FAIR

Philadelphia, Aug. 5—For the first time in many years A. A. races will be held at Byberry, Sept. 10, as part of the program of the tenth annual Philadelphia County Fair. Horace Murphy, Syracuse, N. Y., has been appointed director of the automobile racing. The fair will open Sept. 5. There will be truck and tractor exhibits.

Studebaker Earnings and Production Pass 1920 Mark

**Quarter Ending June 30 Produced
8489 Cars, Compared to
4811 in 1920**

SOUTH BEND, Aug. 5—The Studebaker Corp. for the three months ended June 30 reports a net income, after all charges and factory reserves for inventory adjustment, of \$4,270,547. After payment of preferred dividends this was equivalent to \$6.83 a share on the outstanding common. In the first three months of the year the company reported net profits of \$2,210,577.

Net sales for the second quarter of 1921 were \$33,059,834, as compared with \$22,249,299 for the same period in 1920. Total assets are \$96,880,381, including trade name and good will, which are valued at \$19,807,277. Inventories amount to \$20,926,304, cash to \$6,376,030, sight drafts to \$3,318,068, and accounts and notes receivable to \$5,879,734.

The company has no notes payable, and accounts payable amount to only \$3,892,413. Miscellaneous liabilities are listed at \$3,165,772, and the reserve for federal taxes amount to \$2,617,023. There is a special surplus account of \$3,645,000 and the regular surplus stands at \$13,760,000.

Production of cars in the quarter ended June 30 reached 8498, as compared with 4811 in the same quarter last year.

FALOR TO MAKE TUBES

Akron, Aug. 5—The Falor Mfg. Co., Inc., headed by Shelby A. Falor, a former Goodyear official, started production today in its new factory in South Akron and will continue on a production basis of about 400 automobile tubes daily. It is announced the company will specialize in the manufacture of automobile tubes. Falor was with Goodyear for over 20 years as director of the sales department. He developed the Goodyear field in motorcycle tires.

For the past three years he was a member of the Goodyear board of control. He resigned when the board was abolished under the new financial control of the company and when the office of comptroller was substituted for it by E. G. Wilmer, successor to F. A. Seiberling as president.

CLEVELAND DEALERS PARADE

Cleveland, Aug. 6—Automobile dealers and manufacturers increased their prestige when they produced one of the most attractive and instructive divisions of a big parade that was held here recently in connection with the city's 125th anniversary celebration.

Every automobile manufacturer in the city was represented by an exhibit, and so were most of the retailers. One of the most interesting exhibits in the parade was the old one-cylinder automobile that was produced by Alexander Winton.

German Interests Seeking Return of Bosch Control

Former President of Magneto Company Will Again Enter U. S. Manufacturing Field

NEW YORK, Aug. 5—Otto Heins, former president of the Bosch Magneto Co., has arrived in this country from Germany to press his suit to have the sale of that property declared void. It recently was charged that A. Mitchell Palmer as alien property custodian showed undue favoritism to the present owners in the sale of the assets at auction.

Heins is represented by his attorney, Harvey P. Andrews, of this city, who also is acting for several other German interests which are seeking the return of the property they formerly owned. Associated with him in this work are Clarence D. Miller, secretary of the Republican National committee, and John Thomas Taylor, head of the Washington office of the American Legion, according to a statement by Andrews. Andrews has had much correspondence with the Republican senators and representatives who are members of the Foreign Relations Committees of the two houses of Congress. Andrews himself has been prominent in Republican politics in this city.

Never Declared an Enemy Alien

Heins, who is a German citizen but is said never to have been declared an enemy alien, returned to Germany early in 1920 having been reduced from the status of a millionaire almost to that of a pauper. He has completed the reorganization of his business interests in Germany and has visited England, France and other countries. He now has come to the United States to make a strong effort to regain control of the company now known as the American Bosch Magneto Corp.

Regardless of the success of his suit, Heins intends to go into business in competition with the American Bosch Magneto Co., according to Andrews, "and expects to surpass them all in the manufacture of magnetos." His attorney added that he expects to file patents very soon and will manufacture a new spark plug and lighting system.

The action started against Palmer on behalf of Heins over the sale of the Bosch Magneto Co. alleges fraud and demands that the sale be declared null and void. It is charged that Palmer sold the property to Martin E. Kern, a personal friend, for \$4,500,000 although it was worth \$12,000,000.

BERRIES, MELONS, BOOM TIRES

Atlanta, Aug. 5—Tire sales in this section improved materially during July, in most cases sales for the month being reported in excess of the totals for July, 1920. The increase evidences an early return to pre-war conditions in the tire business.

Most of the sales have been in the rural districts, especially in the peach, berry and melon belts, where the farmers and growers have experienced one of their most successful seasons in years. If the business continues as good the remainder of the season as it has the past two months the tire industry in this section, at least, will be on as firm a basis as at any time prior to the war, in the opinion of local dealers and managers for the factory branches. Fabrics appear to be experiencing a much larger demand than cord tires.

Drives 3000 Miles to Cotton Patch in 22 Days

TLAHAUALILO, Mexico, Aug. 5—Henry Potter, who with James Brown Potter of New York and associates, is one of the owners of the Tlahauaililo cotton plantation of 180,000 acres, in this part of the Nazas River valley arrived here a few days ago with his wife. They made the trip of 3,000 miles in an automobile. They were 22 days on the road, and, according to Mr. Potter, they met with no difficulty of travel until they reached the irrigated part of Laguns district which obtains its water from the Nazas river. They found it a hard matter to cross some of the irrigation canals.

The Tlahauaililo plantation is situated about three hundred and fifty miles south of the Rio Grande. The property was damaged considerably by revolutionists, as for a time Francisco Villa made his headquarters here.

LaCrosse Tractor Sells Plant to Oshkosh Concern

La Crosse, Aug. 5—The Oshkosh Tractor Co. has purchased the entire assets of the LaCrosse Tractor Co. which for the past five years has manufactured the Happy Farmer tractor, later known as the LaCrosse tractor. All the machinery, tools and material will be removed to Oshkosh as soon as an adequate factory can be completed and production of the same models will be continued there. Work on the factory will be started at once. The plans call for a main building 500 by 150 feet modernly equipped. The Oshkosh Tractor Co. is capitalized at \$1,500,000 and is headed by A. D. Paine as president and general manager. Paine also is manager of the Wisconsin Tractor Sales Co. I. G. Hickman, Milwaukee, is vice president and C. C. Shanor is secretary, treasurer and sales manager. L. W. Melcher, as factory manager and designer of the LaCrosse tractors, will act in the same capacity for the Oshkosh company.

Goodyear Reorganization Reduces Plant Personnel

Many of Oldest Employees Resign When Economies of New Regime Become Effective

A KRON, Aug. 5—With all office and factory departments of the Goodyear Tire & Rubber Co. placed on a budget system effective Aug. 1 under the new financial control of the company, sweeping salary reductions have been made in the offices in addition to reductions in office personnel. In order to keep each department within its respective budget, many departments have cut personnel over 10 per cent, while all departments have reduced salaries from 10 to 20 per cent under the budget paring.

The readjustment of office personnel at Goodyear has resulted in the resignation this week of some of the company's oldest officials and employees, including George Rogers, in charge of credits and collections, who has been with Goodyear for 20 years. He was one of the first associates of F. A. Seiberling when Goodyear, then two years old, was struggling for a foothold in the rubber industry.

Other resignations announced include those of Harry Blackburn, assistant treasurer; Marshall Morris, formerly assistant general manager of the Goodyear company in California and more recently in charge of the new stock issues under the refinancing program; F. F. Dugan, in charge of sales personnel; Don Stevens, in charge of the factory labor department, and Dr. Clyde Leeper, medical officer in charge of the office dispensaries and nurses staff.

W. D. Shilts, chairman of the board of control under the Seiberling regime, which was abolished when E. G. Wilmer succeeded Seiberling as president, has been assigned to install the budget system in Goodyear branches and to reduce expenses in all branch offices. C. C. Prather, manager of the products department, has been transferred to the sales department and assigned to Cincinnati as a general lines salesman. C. T. Crudginton, editor of the Goodyear Tire News, and lately assigned to Council Bluffs, Ia., as a general line salesman, has resigned and returned to the east.

VER LINDEN PLANT GROWS RAPIDLY

Lansing, Aug. 6—Rapid progress on the Ver Linden plant of the Durant Motors Corp. is being made. The Christman Construction Co., which has erected four cement towers for work, is now completing the second floor of the main plant and its various units. Steel for structural work on the warehouse and the enameling plant is on the ground and work is started. The Christman company is beyond schedule on the plant and from the present outlook will have no difficulty in turning over the plant to Edward Ver Linden on Nov. 1.

Conflicting Laws Promise War Relief in New England

Fight Now On Over Truck Weight Limits in Maine and Lights in Massachusetts

BOSTON, Aug. 5—There is a nice row brewing in New England now in which the different States will be fighting each other over interstate traffic in cars and trucks. Maine has started the fight with inspectors enforcing the law regarding the limit of weight, 18,000 pounds, for motor trucks, and Massachusetts will come into action with its new headlight law August 15, which will make vehicles from other states not complying with it, unlawful in the Bay State. Then Connecticut and New Hampshire and Rhode Island may take a hand in the controversy and hold up Massachusetts motorists because they are not complying with laws of other states.

Will Not Accept Consignments

The result of the fight in Maine on trucks has reached such a stage that the owners of a number of vehicles from Massachusetts have stated that hereafter they will not accept consignments for the former state as they cannot operate successfully if their loads are restricted. The Maine inspectors have held a number of trucks, and all those overweight have been notified that a second offense will mean being brought to court and fined.

Naturally, Massachusetts will be expected to retaliate and so there will be a series of artificial barriers between the different states. The Bay State headlight law calls for certain devices, and 21 candle power bulbs, which must be properly focused. Connecticut allows 24 candle power bulbs, and since motorists there have such bulbs, they will not feel like buying new ones for the sake of meeting the Bay State law in case they want to pass through that state to the mountains. Therefore, Massachusetts is expected to say to Connecticut tourists that they are not complying with their law, and they may be stopped.

The squabble over the truck lights is just being ironed out after several conferences when it was expected that there would be friction. It seems, in considering trucks, the fact that the majority of them used gas lamps instead of electric, was overlooked and soon the truck owners found that they could not comply with the law without the expense of re-equipping their vehicles. Then representatives of the Prest-O-Lite came here and conferred with the state officials. At first the regulations waived the use of different types of lenses and devices on the heavier trucks using solid tires, but the gas people insisted that all trucks should be allowed to come under the ruling for gas lighting. Finally it was decided to have a test and one was made by the gas representatives and they produced a burner which was expected to meet the

requirements. It had been arranged that in case there was no chance for the trucks under the law the gas people were going to bring suit and seek an injunction against the law becoming operative.

Just what the attitude of New York will be is problematical. Many New York cars use the Massachusetts roads, but they will not be obeying the law. Motor Vehicle Registrar Frank A. Goodwin states that any vehicles from other states not obeying the Bay State law will be held up.

Armored Car to Bump Off Thieves

SAN FRANCISCO, Aug. 5—The San Francisco police department has ordered an armored automobile, and Roy Alexander of the Peacock Motor Sales Co., is drawing the specifications. The tank will hold seven passengers, have a speed of 90 m.p.h., and will be protected by armor plate with a steel windshield and projecting bumpers for disabling another car. A machine gun will be mounted forward. The car will be in command of Sergeant Arthur McQuade of the automobile detail, and it will be especially designed for running down automobile thieves.

Hold Up Georgia Dealers to 25 Per Cent Tax Boost

Atlanta, Aug. 5—In spite of the fact that the Georgia Automotive Dealers' Assn. has been bitterly opposing any increase in taxes at this time, the Georgia State Legislature will undoubtedly pass a bill in the very near future that will increase taxes for automotive dealers in this state over the present schedule by approximately 25 per cent.

A bill to increase the tax on garages from \$25 to \$200 met with such bitter opposition that an amendment was adopted, setting the following schedule: garages in cities of over 25,000, \$50; cities 20,000 to 25,000, \$35; cities 10,000, \$7.50; less than \$10,000, \$5.

It has been proposed to place a separate tax on each make of car handled by dealers but this was also amended and virtually stricken out. Passenger car dealers, motor truck dealers and tire and accessory dealers will, however, pay about 25 per cent more in general taxes. Automobile schools are taxed \$10, and automobile assembling plants \$500 in each county, and truck assembling plants \$300 in each county. Regularly licensed dealers are exempt from the garage tax.

WRIGHT NEW DURANT DEALER

Philadelphia, Aug. 6—George R. Wright, for the last eight years branch manager for the Chevrolet Motor Co., has been appointed distributor in Philadelphia and surrounding territory for the new Durant car.

Improved Conditions Place Southeast Near Normalcy

Section with Atlanta as Center Is in Better Shape Than at Any Time Since 1918

ATLANTA, Aug. 5—Business, industrial and economic conditions in the southeast are more nearly normal today than they have been at any time since 1918, and business generally is on a sounder basis.

Investigation of the records of licenses issued during July and of transfers of licenses, at the office of the Secretary of State in Atlanta, indicates that automobile sales in this city and in the state at large were less than they were in June. About 400 sales are shown in the city of Atlanta alone, this including trucks, passenger cars, used cars and used trucks, the total for the preceeding month being much larger than this. While these records do not represent all sales that were made in Atlanta during the month the figures nevertheless provide an accurate and reliable barometer of sales conditions.

A large number of sales have been made the past month which have not as yet been recorded at the office of the Secretary of State, the buyers using the emergency tags until after July 31 when the state's fiscal year ends. All licenses issued before July 31 are paid for at the rate of the full year, while those issued after that date are paid for only the remaining half of the year. Taking the official figures, therefore, as a basis, about 500 new and used motor cars and trucks were sold at retail in Atlanta during July.

Outside of Atlanta, and especially in the smaller towns, sales during July were less than June.

TEMPLAR ROADSTERS ON TOUR

Cleveland, Aug. 5—Starting a 5000-mile trip, three Templar roadsters left the factory July 3 with the intention of calling on every Templar dealer east of the Mississippi.

During a convention of dealers at the factory in May, suggestions for improvements to the car were asked for from the dealers. A summary of these suggestions was made and indicated no change in engineering features, but did indicate a number of changes in finishing and appointments. The dealers were told that their suggestions would be given consideration but no other promises were made. However, before the convention had come to a close three cars were in process of construction containing every new suggestion offered. It is these cars that are now on tour.

One car is finished in white, a second in blue and the third in red. More than one hundred towns and cities will be visited during the trip which will take about two months to complete.

Forces Fordsons to Raise Salesmanship of Dealers

Tractors Used As Test to Lift Standards of Selling in Industrial Centers

DETROIT, Aug. 8—Henry Ford's plan of pushing tractor sales through all dealers of the Ford Motor Co., regardless of whether located in the heart of an industrial district or in the center of a farming community, finds defense at the factory in the statement that the plan helps to develop salesmanship among the company's dealers.

No effort is required to sell Ford cars is the the factory view. Selling tractors, however, particularly in some eastern cities where tractors have scarcely ever been seen in operation is considered another question. Of course it will require effort to sell them, admits the factory, but dealers and salesmen are supposed to exert themselves.

There is plenty of opportunity for tractor sales outside of actual farming districts, holds the company. All sorts of pamphlets and sales opportunities are constantly being mailed to dealers setting forth work in which tractors can be used advantageously aside from farm work. In the opinion of the company tractors could be far more serviceable in many forms of general contracting and road construction work than horses.

It was further declared that while the company's experts were constantly at work developing new fields in which tractors might be used, it was part of the dealer's work to discover a few outlets for himself and put sales over. Practically every inch of the United States has been carefully analyzed, the company declares, and no tractors are being shipped where there are no sales possibilities. This holds just as good for New York City as for Jones Crossing.

Furthermore, it was declared, that the Fordson tractor, being operated by kerosene at about 9 cents a gallon in practically every section of the country, did not suffer the handicap confronting gasoline consuming machines, of being uneconomical in the face of present prices for horse feed.

There is no question in the company's mind but that the tractor policy is sound. It is firmly convinced that every dealer who has received tractors will sell them as soon as he gets to work. And getting to work on tractors will but keep him in good merchandising condition to keep his sales of cars up to the high point that they are now reaching in all parts of the country.

ALABAMA DEALERS MEET

Coden, Ala., Aug. 6—A closer organization was perfected and worth while efforts put forth with genuine accomplishments by the automobile dealers of Alabama at their two-day semi-annual convention which closed July 26.

National and state legislation affecting the business of the members was

gone into thoroughly and all members pledged themselves to cooperate in getting those laws and measures passed which are for the good of the state.

There was talk of selecting a permanent meeting place for the association, but this matter was postponed for consideration at the annual convention, which will be held in Montgomery in January. Many members rather like the idea of meeting on or near the gulf coast and it was suggested by some members that the annual meetings be held in Montgomery and the semi-annual ones at Coden or some other coast town.

"Rube" Drivers Plague Capitol "Cops"

COLUMBUS, Aug. 8—Central Ohio motorists who come into Columbus have devised a novel way of getting around the warnings of the police department for violation of the traffic code. It has been the plan of the Columbus police department to issue two warnings to owners for small violations before they are called into police court. These warnings are recorded and the license number taken.

Owners who have received the two warnings quietly discard their tags and purchase new ones at the state automobile department. In that way they are safe for two more warnings and save considerable money, as fines are usually far ahead of the cost of a new set of tags. In addition, the time and publicity of a police court trial is avoided. To obviate this difficulty it is planned to take the motor number of the cars in recording the warnings.

RUMORS DUNLAP SALE TO FORD

Buffalo, Aug. 6 — There is a strong but unconfirmed rumor in circulation here that Henry Ford is to purchase the new \$25,000,000 Dunlop tire plant in the River road district here.

Work on the huge plant, which is near completion, has been suspended for some time, because of business and financial conditions. The rumor has it Ford wants the plant to manufacture tires exclusively for cars manufactured by him.

OREGON DEALERS ENTHUSIASTIC

Portland, Ore., Aug. 8—Steps to expand the Oregon Automotive Dealers Assn., the state wide organization which is affiliated with the National Automobile Dealers' Assn., were taken in Portland on July 20 at a meeting of representative dealers throughout the state with P. F. Drury, assistant general manager of the national association.

Mr. Drury is on a tour of the Pacific northwest, from headquarters of the national association in St. Louis, and is visiting the principal cities and speaking before the various associations.

Parts, Repairs, Sales Keep Columbus Business Brisk

Rural Sales in Central Ohio Are Slow With Some Promise of Improvement

COLUMBUS, Aug. 6—A continued improvement in the demand for passenger cars is reported from practically all of the agencies and distributors of Columbus. The business is now definitely on the upgrade and it is believed that the improvement will be continuous. The only exception to the general improvement is the demand for Fords, which has fallen off materially since the newspaper publication of the coming of new models with a possibility of new prices. With the publication of these stories, all of which have been denied by Ford factory officials, business fell off with a thud and efforts of the salesmen of the various Ford agencies have not succeeded in securing normal business.

In other makes trade is still stimulated by the recent price reductions, and agencies generally are fairly busy. This applies to cars ranging in price from \$800 to \$3,500 and in some instances higher priced cars. But the usual run of business is now for the medium priced lines, and these are showing the best improvement.

Worst of Slump Now Over

The unemployment situation in Columbus is better than was the case several weeks ago. This is an encouraging factor, and presages a continuation of the improved demand. It is believed that the worst of the slump is now over, and dealers and distributors are making plans accordingly.

In the country districts trade is still slow, although some slight improvement is reported. The crop prospects are slightly better with recent heavy rains, and the farmers are showing some disposition to come into the market. But little trade is anticipated in the rural sections for some time, as the farmers are not having a prosperous season in the Buckeye state.

Truck Business Slow

Truck business is still slow with the exception of the demand for light delivery wagons. The heavy truck business is at a standstill, and little hope of immediate revival is seen. Heavy haulers have a good supply of trucks and they are not coming into the market as a result.

Repair business at virtually all of the service stations and repairshops in Columbus has been good. Some of the service stations are fairly well crowded with work while others have sufficient work to run with a good force from week to week.

There is also a demand for parts of all kinds, and this is one of the good features of the automobile business here.

Sales in California Best Business in Three Years

Accessory Dealers Get Large Share of Increasing Volume; Camp- ing Outfits in Demand

SACRAMENTO, Aug. 5—Dealers in motor cars are not the only ones who are partaking of the joys of the restoration of the motor car industry in California, for the accessory dealers are enjoying a volume this summer beyond their fondest dreams. It is the California vacationist and the visiting tourist, of course, who are doing the work for them.

Tire dealers particularly have rejoiced in the long, hot summer, which has made the pavements blow out casings that ordinarily would have served another thousand miles. Then, too, mountain travel is none too gentle with the rubber shoes of the motor car, and, all in all, tire dealers have had just a little bit the best of the automotive business in this state this year.

Accessory dealers, of course, are selling those innumerable things necessary to every motorist. Camping equipment has been in heavy demand, and supply stores have been hard put to it to keep abreast of the call for this class of goods.

Automobile dealers have been enjoying the best season in three years, and really the best they have known since the business developed, for it is built upon stable conditions. Not a few of the contract sales of war times have come back upon the hands of the dealers since the war work ended. The dealer has not lost, for the payments made in most cases more than took care of the depreciation of the car. Now, however, with conditions settled, and the price reduction flurry apparently at an end, business is moving ahead rapidly.

One of the most encouraging and convincing proofs of this is the fact that automobile salesmen, driven from their business to other vocations during the recent financial depression, are returning rapidly to their old firms.

CANADA LICENSE DEALERS

Montreal, Aug. 5—The automatic adoption of amendments to the law concerning junk dealers and second-hand dealers took place this morning. This will make it compulsory for anyone dealing in second-hand automobiles, motorcycles or bicycles or their accessories to be licensed as a second-hand dealer and to keep a list of all articles purchased by him, the name of the vendor and the price paid for them.

The growth of theft of motor car accessories has been pronounced of late. Motor thieves, finding it difficult to get stolen cars off the island, have adopted the practice of stealing a car, driving it to some quiet spot and there dismantling it of tires, lamps, meters, clocks, tool boxes, horn, cushions and, in fact, every-

thing that is movable on the machine. They have presumably found a ready market for such accessories, and it is in order to check this that the by-law has been passed. No person will have the right to purchase any of these accessories unless he has taken out a license as a second-hand dealer, and he must keep an accurate record of the purchase and of the vendor.

Automobiles Junk Two Yankee Railways

NEW YORK, Aug. 6—An effect of automobile travel on railroad operation is shown in the decision of the Interstate Commerce Commission authorizing the abandonment of two branch lines of the Boston & Maine Railroad in New Hampshire. One, extending from Cherry Mountain to Jefferson in Cross county, a distance of three and one-half miles, was built in 1892 for the accommodation of summer resort travel. The increase in motor car travel has caused a steady diminution in the passenger traffic, and in 1919 and 1920 the company reported that the average number of passengers per train was three, with total freight revenues in 1920 amounting to \$88 and total passenger revenues \$319.

The other branch line extending from Bethlehem Junction to Profile House, in Grafton county, a distance of nine miles, also had to give way to the competition of automobiles, as the report shows that the average number of passengers per train during 1920 was two, with revenues amounting to \$1,713 and operating expenses \$12,940.

TRUCK INTERESTS TO UNITE

Philadelphia, Aug. 5—A great campaign has just been started by the Motor Truck Assn. of Philadelphia to secure every motor truck owner and dealer throughout the state as a member of its organization.

It is the thought of the organization to combine with the Motor Truck Association of Pittsburgh, so that there will be two big allied associations, one at each end of the state, which will work together in close harmony in legislative, as well as in other matters. The Pittsburgh association will aid in the membership campaign, working along the same lines as the Philadelphia association.

ELGIN BUSINESS BOOMS

Argo, Ill., Aug. 5—The Elgin Motor Car Corp. has informed its dealers that the number of cars shipped for the month of June was 102 per cent larger than for any other month in the past seven. Orders on hand June 1 were 259 per cent larger than for any time in seven months and orders received 305 per cent greater. The cars on hand during June were 300 per cent less than the total in January.

Cabinet Officers Offer Small Hope to Sales Tax

Automobile Industry Again Strongly Pleads for Relief from Un- fair Revenue Measures

WASHINGTON, Aug. 5—Another strong plea was made for the sales tax by representatives of the automotive industry, in conference with Secretary of Commerce Hoover and Secretary of the Treasury Mellon. These administrative leaders were unable to hold out any hope for the adoption of the sales tax program because the administration has advised Congress that a sales tax would not be recommended unless an additional assessment was needed for a soldiers' bonus. Secretary Hoover refused to commit himself and Secretary Mellon indicated that he could not run counter to his present program of tax revision.

The House Committee on Ways and Means has ruled out all testimony regarding the sales tax because it considered it a waste of time to continue hearings, inasmuch as they have already determined that the sales tax would not be incorporated in a new revenue bill.

Excise Tax Should Be Repealed

C. C. Hance, chairman of the Tax Committee of the Automobile Chamber of Commerce, told Secretary Hoover that over-taxation and under-taxation has been disturbing business equilibrium. He declared that the excise tax was a war measure and should be repealed in all fairness to the automobile industry. It was his contention that this tax is a "stigma" tax upon the automobile and other industries and forms a sales resistance which unbalances normal consumption. Hance further declared that prosperity cannot return without a substantial return of consumer ability and told the conference that the sales tax was easily adaptable.

J. Walter Drake, John Long and Pyke Johnson were other representatives of the N. A. C. C.

James A. Emery, general counsel of the National Assn. of Manufacturers declared that:

"One-third of the net income of corporate business is paid in state and national taxes. The excise taxes, excess-profits taxes, and other special taxes make it impossible for business to forecast definitely what its costs are going to be. Under a non-discriminatory sales tax, properly administered, business would not be confronted with the uncertainties of the present system and could figure its cost of taxation accurately."

Both Hance, and Lew Hahn, the latter of the National Retail Dry Goods Assn., raised the question as to whether the practice of choking so-called non-essentials by excessive taxes was fair, inasmuch as it can be readily seen that the public would not purchase these so-called non-essentials during the time of depression and that the decrease in sales would be sufficient penalty.

Race Engine Rules Not to Change Passenger Design

Makers Will Continue to Build Cars of Prescribed Size and Weight

DETROIT, Aug. 8—The action of the Indianapolis Speedway Assn. in limiting the engine displacement of entries for the 1923 race to 122 cu. in. is not expected to have an important effect upon the design of engines for other than racing models, in the opinion of leading engine manufacturers of this city.

With the use of the smaller engine the car to be driven by it must be smaller and lighter, it is declared. This can be done with racing models and it is expected that cars appearing in races under this displacement limitation will be small, light vehicles, built very low to hug the track so that they will not upset traveling at high speed.

Passenger car and truck engines will continue to be built to propel vehicles of prescribed sizes and weight and will not be affected by arbitrary rulings of any source. Since the industry began, it is recalled, improvements have gone forward steadily in engine construction and this is just as much the rule today as ever.

Important Changes in Engine Design

The years 1922 and '23 are expected to show some important changes in engine design and construction, these embodying the results of long continued research work and experiment in this country and abroad. Just what the principles of these are is not revealed, but they are designed along lines of greater economy and commercial application.

There is a feeling here that the plan of building engines for racing purposes only will be overcome by the formation of the proposed national racing organization. One of the results of this, engine makers say, will be the advancement of racing with standard equipped models, and the gradual surcease of the race contested by cars little more than laboratory products.

SAMSON FACTORY MOVES

Janesville, Aug. 5—The transfer of the Samson motor truck assembly plant from Flint, Mich., to the headquarters and main works of the Samson Tractor Co. at Janesville, Wis., has been going on throughout the month of July and is now about completed. From 20 to 25 carloads of truck parts, chassis, axles, etc., were received from Flint each week. The motor truck operation will be concentrated at Janesville, although the manufacture of certain parts will be continued at Flint.

The Samson works at Janesville already form one of the largest units of the General Motors group and a five-year building program which is now about 40 per cent completed will make it probably the largest plant in the world

devoted entirely to the production of agricultural equipment, which includes Samson tractors, Samson farm trucks, Samson nine-passenger farm cars, Janesville tractor implements, etc.

Car a Minute Crosses State Line

SACRAMENTO, Aug. 5—Some idea of the motor travel along the Pacific coast may be gained from the fact that more than a car a minute passes the Oregon-California line. A count was made at the state line recently for three hours: one hour in the early forenoon, one at noon and one in the afternoon. During that time 226 automobiles passed, an average of more than one a minute, despite the fact that the road is over the Siskiyou mountains and leads into mountainous country on either side of the dividing line between the states.

36 Per Cent Tire Workers Almost Equal Peak Output

Akron, Aug. 5—Employment records from the nine major rubber companies in Akron show that between 26,000 and 27,000 day workers and tire builders now are being employed, as compared with about 72,000 in the same factories during the peak months of the tire industry in the spring of 1920. The low ebb of employment is reported to have been slightly under 19,000 factory workers in December of last year and January of this year. The records apply only to day workers, and not to office employees or salaried factory employees.

The employment figures are regarded as significant, in view of the fact that these same nine rubber companies are producing over 80 per cent of their peak production of 1920. This indicates over 80 per cent of peak production with 36 per cent of peak employees, showing a high percentage of increased efficiency, both individually and collectively, among factory workers.

For example, the Goodyear company when it had a peak production of 31,181 tires daily had nearly 33,000 employees on its payroll, including its office personnel. Today Goodyear is producing 28,640 tires with about 13,000 employees.

The employment figures cover the Goodyear, Goodrich, Firestone, Miller, Kelly-Springfield, Swinehart, Star, General and Mohawk factories in Akron.

TRACTOR DEMONSTRATION RESULT FIGURES

On page 23 of the July 21 issue of MOTOR AGE there appeared a tabulation on the man cost per acre in which the figures under the heading "man hours" were represented as 94 cts., etc. These figures should have been, reading from top to bottom, .94, .95, .95, .84.

Parts Makers Orders Show Increasing Fall Business

General Improvement in Sales Expected During Months of August, September and October

DETROIT, Aug. 8—General improvement in passenger car business in August, September and October, with gains for each month over the month before, is indicated in orders now being placed with leading unit parts makers. November and December are expected to show a falling off, but a general sales spurt all along the line is declared certain to follow the turn of the year and the opening of the show season.

Planning Manufacturing Schedule

Many of the car manufacturers are already planning a manufacturing schedule in anticipation of spring business, which they will get under way in December. Some of the others are known to be outlining a schedule which will start off promptly the first of the year, while the remainder will wait the opening of the actual selling season and trust to ability to speed up quickly to meet demands.

All of these arrangements depend to a large extent upon the financial position of the different companies. The stronger companies will start to stock up first and will build a little higher than the others. There has been much conjecture on just what the attitude of the companies would be toward preparing for spring sales, and apparently the first impression that little stocking would be done is proving wrong. The spring of 1922 will find, however, many thousands less cars piled up than was the case in 1921.

Passenger car production in all Detroit factories today is being held strictly to sales levels, and there will be little accumulation of cars before December. This is far different from the situation last year which resulted in the storing up of so many cars over the fall and winter months.

There is little sign of parts business from truck manufacturers. Business is continuing at low ebb in this field with probably little hope of revival for some time.

CROP ROTATION AIDS SOUTH

Detroit, Aug. 8—While Ford business in all parts of the country is continuing at record heights, the company is particularly elated with improvements in the south and mid-west, where for a long time things were at a standstill.

In a casual analysis of the changed situation in the south the company expresses the belief that the elimination of the one-crop plan in favor of diversified crops is responsible for the new order of things. Prosperity will be no longer dependent upon the market price for cotton or sugar or rice, southern dealers assert to officials, but will be a permanent and welcome guest in the land.

Wisconsin Organizations Protest Mellon's \$10 Tax

Would Marshall 10,000,000 Owners Against Congress in Effort to Kill Measure

MILWAUKEE, Aug. 8—The storm of opposition and protest that has arisen in the automotive industries and among users against the proposed national tax on passenger and commercial cars has taken organized form in Wisconsin under the leadership of associations of manufacturers, dealers and owners. Jesse A. Smith, president of the National Automobile Dealers' Assn. said: "While both the National Automobile Dealers' Assn. and the National Automobile Chamber of Commerce have representatives at Washington fighting to defeat this proposition, we need the united protest of owners added to ours if this tax is to be defeated. While Congress is reported to be lukewarm on the proposal of Secretary of the Treasury Mellon, which is reported to have the support of the President, we are apprehensive, for it is a fond idea of legislators to regard the motor car as a 'luxury,' to feel that owners are wealthy persons, and thus may be taxed at will. Owners now pay a 5 per cent tax on new cars, are required to pay state and sometimes local license fees, personal property taxes, and state and local road taxes. Seventy-five per cent of the passenger cars in this country are used for business, and trucks certainly are business cars. We believe the motor vehicle already is overtaxed, and no additional burden should be imposed."

Maintaining Good Roads

Bart J. Ruddle, executive secretary and manager of the Milwaukee Automotive Dealers' Assn. said: "We are maintaining good roads in Wisconsin and paying heavily for them. Why should we also be called on to help some undeveloped state build its roads. We have repeatedly made our case known to members of Congress and we will not halt our efforts in opposition to the proposed federal tax until it is definitely killed. Vigorous protests from other parts of the country also have been made. There are 9,260,000 owners in the United States and I doubt if Congress will dare to antagonize them further. In addition to all other taxes, motor trucks are compelled to pay an 8 per cent transportation tax and it is not right and proper that the great national transportation system being built up with commercial vehicles should be penalized more than it already is."

WEED CHAIN SAFEGUARDS RIGHTS

New York, Aug. 8—Representatives of the American Chain Co. declined today to state what policy would be pursued in reference to the Weed chain when the basic patent covering it, No. 768495, runs out Aug. 23 next. The only comment made was that "we have not been asleep

in reference to the Weed patent." The inference was that the company has prepared to put an improved chain on the market. It was said an announcement covering the subject would be made about Sept. 1.

When the patent expires there will be nothing to prevent the manufacture of the Weed chain by anyone who cares to produce it. Infringements will be prosecuted up to the end of this month, however. An infringement suit was won by the American Chain Co. last March.

The Parsons patent, No. 723299, under which tire chains were manufactured by the American Chain Co., expired on March 24, 1920.

Runs 1300 Miles to Burn at Home

SACRAMENTO, Aug. 5—E. H. Huntington of Santa Rosa, took a 1300 mile vacation trip without a mishap—not even a puncture or blowout. Returning home, he went in to unlock the door of his house and assist his wife with the hand luggage. When he returned to unpack the camp equipment, his automobile was in flames. A short circuit is blamed for the loss of the car.

Slightly Decreased Numbers Hold to Jobs in Cleveland

Cleveland, Aug. 8—Cleveland automobile and accessory manufacturing establishments were employing on July 30 3.6 per cent less persons than on June 30, according to a survey made by the Committee on Labor Relations of the Chamber of Commerce.

Twelve manufacturing establishments reported in the survey of the automobile industry and on July 31 they were employing 7,463 as compared to 7,742 on June 30.

Employment figures in all industries show that pay rolls on the average remained about stationary during the month of July. There were 54,165 employed June 30, in the 99 establishments that reported in the survey, while at the close of July, 54,161 were on the pay rolls.

In the metal and metal products other than iron and steel there was no loss; in the iron and steel industry the loss was 1.3 per cent.

MERCURY SIX IN PRODUCTION

Montreal, Aug. 6—The Canadian Automobile Corp. has started factory operations at Lachine, where it has taken over the plant of the Rapid Tool & Machine Co., Ltd., pending the erection of a permanent one in Longueuil Parish, a site which was recently purchased. The car to be produced is the Mercury Six.

The actual assembly of parts was started three weeks ago. Those in charge of the factory are G. E. Brennan and H. Potter, formerly engineer and production expert to Stevens-Duryea.

300 Per Cent Duty to Stop Reimporting War Supplies

Graham Resolution Offered as Effective Barrier Against Foreign Syndicate Activities

WASHINGTON, Aug. 5—Chairman Fordney of the House Ways and Means Committee has indicated that special attention will be given the Graham resolution calling for a levy of 300 per cent on reimported war supplies. It is expected the resolution will be reported out very soon in order that it may be considered in the House before debate begins on internal tax revision. Automobile dealers believe that the Graham resolution will afford better protection against underselling by foreign speculators than the tariff bill now pending.

The Graham resolution is more drastic than the provisions carried in the House tariff bill and it levies specific duties which are prohibitory. With the resolution through the House, its passage could be expedited in the Senate and the resolution would become effective several weeks before the tariff bill is enacted, thus putting an immediate check on reimportation activities.

It is known that the majority of the members of the Ways and Means committee are in favor of this provision as interim legislation. They are receiving numerous complaints to the effect that European and American speculators are selling American war supplies at prices defying American competition.

GEAR COMPANY TO TRIPLE FORCE

Buffalo, Aug. 8—Operations will shortly be resumed on a 1920 scale by the Dittmer Gear & Manufacturing Corp., Lockport, N. Y. Production will be increased to the standard of busy days by the employment of triple the number of men now at work in the plant, it is announced. The firm manufactures gears for 30 producers of automobiles.

KALAMAZOO LOWERS PRICES

Kalamazoo, Aug. 8—Reductions ranging from \$300 to \$425 on all models of its trucks are announced by the Kalamazoo Motors Corp. Two new models also will be added to its line. The model G-1 1½-ton is reduced from \$2800 to \$2495; model G-2 1½-ton from \$3100 to \$2800; the 2½-ton from \$3700 to \$3275; the 3½-ton from \$4300 to \$4000; the 5-ton from \$4800 to \$4500. A new 3-ton model will sell for \$3700 and a special road builders' 5-ton new model for \$4800.

GEORGIA KILLS CENT TAX LAW

Atlanta, Aug. 5—Contrary to expectations the bill before the Georgia State Legislature providing for a one cent per gallon retail sales tax on gasoline has been defeated. Automobile dealers bitterly opposed the bill, not so much because of the additional one cent per gallon they would have to add to the price of gas, but because of the extra amount of bookkeeping such a law would compel.

Cotati Bowl Thought to Hold World's Speed Record

Eddie Hearne Does 111 Miles in Elimination Trials Preparatory to Aug. 14, 250-Mile Race

COTATI SPEEDWAY, Calif., Aug. 8—Cotati, heretofore to fame unknown, has become over night the center of the automobile racing world of the western United States, through the arrival here of famous drivers from all over the globe who on Sunday, August 14, will divide \$16,000 in prizes for the races with which the new Cotati bowl will be opened. Each driver who qualified at the elimination trials in the bowl July 31, and who maintains an average of 100 m.p.h., or better, in the races on the 14th, will receive \$500 if he fails to win a prize.

The entrants who qualified in the elimination trials the last day of July, the average speed they made, and the cars they will drive in the 250-mile race the second Sunday in August are:

Eddie Hearne, 111 miles, Duesenberg-Distil.

Joe Thomas, 108 miles, Duesenberg.

Roscoe Sables, 107 miles, Duesenberg.

Allen Soules, 107 miles, Frontenac.

Eddie Miller, 102 miles, Duesenberg.

Tom Elliott, 99 miles, Leach Special.

John A. Thiele, 97 miles, Duesenberg.

Official entries for the race close August 9, and there will be elimination trials until that date. Other entrants, who, at the time of the sending of this telegram had not qualified, were Tommy Milton, who will drive a Durant Special; Tom Alley, Distel-Frontenac; Ira Vail, Leach Special; M. J. Moosie, Clineworth Special; Jim Crosby, Lanstar Special, and Howard Wilcox, Peugeot.

Honors to Eddie Hearne

More than 10,000 persons saw the elimination trials in the Cotati bowl Sunday, and not an accident of any kind marred the day. From a spectacular point of view the tryouts were tame, but proved that the track is fast and indicated that some new records will be hung up on the evening of August 14. Honors for the fastest driving of the eliminations went to Eddie Hearne, who averaged a little below 111 miles an hour, three miles an hour faster than he did at the Beverly Hills speedway. His time for one lap was 40 1/5 seconds, within 2/5 of a second of the record time set by De Palma in the south this year.

The elimination trials at the bowl, which is about midway between Santa Rosa and Petaluma, drew a crowd which filled one of the big grandstands, partially filled another, and left the management and the officials-elect the feeling that 75,000 to 100,000 people will attend the opening of the speedway, the first of its kind in the San Francisco district, though there is a speedway at Fresno and another at Tacoma.

Paul Derkum of Bakersfield was the starter at the elimination trials, and waved the varicolored flags even closer

to the roaring monsters than does the reckless Fred Wagner. E. E. Cheffins was official representative of the A. A. A., and will so officiate at the racing Sunday. Hart Weaver, of San Francisco, ably played the part of assistant to Derkum, and H. E. Patterson, manager of the Fresno speedway, was a guest in the judges' box.

One of the most pleased men on the track was Jack Prince, veteran of many track openings, builder of several large speedways, and promoter of the Cotati bowl, which he claims will be the fastest track in America, pointing to the performance of Eddie Hearne in the eliminations as an indication. Joe Thomas also said he considered the Cotati bowl the fastest track in the world. President O'Connor, of the North Bay Speedway Assn., extended greetings of the day to everybody present, explained plans for the race of the 14th and announced the official entry of Tommy Milton in the event.

The officials selected for the big day are: Dan H. Lafferty, referee; Cliff Durant, pacemaker; Paul Derkum, starter; E. H. Pendleton, timekeeper, and Eddie Rickenbacher, honorary referee. Rickenbacher's presence at the opening of the bowl is problematical, as he has severed his connection with the Durant Motors Co., told his friends goodbye and announced his departure early in August for Detroit. The \$16,000 prize money is to be divided as follows: first, \$5,000; second, \$3,000; third, \$2,000; fourth, \$1,500; fifth, \$1,000; sixth, \$900; seventh, \$800; ninth, \$600; tenth, \$500.

MILWAUKEE DEALERS BUSY

Milwaukee, Aug. 8—Though city dealers report a very satisfactory business during the last week or two, country dealers complain of the lack of demand. This fact is not surprising when it is considered that farmers are in their busiest season, harvesting and threshing crops. Farmers are just nearing the day when they will be financially fortified to enter the market, the marketing of grains and other produce being in the immediate foreground. This will be the first time this year that the flow of money has been toward farms, and while the volume will be less than in recent years because of the lower level of prices, it is believed that there will be a fair disbursement for passenger cars as well as trucks, tractors implements and other mechanical and automotive equipment.

WILLS SAINTE CLAIRE REDUCES PRICE

Marysville, Mich., Aug. 6—For the second time within two months the price of the Wills Sainte Claire car has been reduced. The last reduction, which goes into effect at once, leaves the price of this car, which has been out less than a year, as follows: touring car, formerly \$3,200, now \$2,875; runabout, formerly \$3,275, now \$2,875. The coupe and sedan are new models and sell for \$3,750 and \$4,100, respectively.

Motor Trucks Target for Trolley Interests' Attack

Electric Lines Responsible for Much Legislation Unfavorable to Highway Transportation

NEW YORK, Aug. 8—A nation-wide propaganda campaign in opposition to the widespread use of motor trucks is being conducted by the American Electric Railway Assn.

The slogan of the campaign is: "Use the trolleys—save the highways."

The chief argument advanced against trucks is that they wear out the highways and do not pay a fair proportion of taxes. The campaign is being conducted by a committee of 100, representing traction companies in all parts of the country. This committee, acting through local electric railway companies, supplies the newspapers with "canned" editorials and other material which purports to show why the trolley companies are not being treated fairly because they are compelled to pay taxes and the motor bus freight and passenger car companies have no obligations of this character beyond their license fee.

Vigorous Efforts Are Being Made

The arguments presented are specious, misleading and unfair. The historic fact that traction companies almost always are far in arrears in their municipal taxes naturally is not mentioned.

The action of this committee probably is responsible for the vigorous efforts which are being made in many sections of the country, particularly in Connecticut, to curb the operations of motor bus lines which have cut deeply into the profits of street car companies by offering lower rates of fare as well as more convenient and efficient service.

The Connecticut Co., which has a virtual monopoly of the traction lines in the state of Connecticut, is held responsible for the enactment of legislation which would prevent competition by jitneys paralleling street car lines. This legislation has been nullified up to the present by injunction proceedings and the court calendars are clogged with test cases instituted by operators of motor buses who have been arrested for violation of the statute. The Connecticut Co. is \$1,800,000 in arrears in its state taxes.

A similar campaign against the use of motor trucks and tractors has been instituted by the Horse Assn. of America, which contends that farm work as well as the hauling of merchandise can be done more economically and expeditiously by the use of horses. In this case also the figures and statistics supplied are misleading.

TO MEET AT MEMPHIS

Memphis, Tenn., Aug. 6—The Southern Automotive Jobbers Ass'n will hold its annual convention in Memphis some time in November, according to William C. Headrick, assistant manager of the Chamber of Commerce.

Concerning Men You Know

Joseph C. de Varona has been appointed special representative for the Maxwell Motor Corp. Mr. de Varona has been with the General Motors Co. for the past five years.

George H. Williams, president and general manager of the Geo. H. Williams Co., Milwaukee, distributor of the Franklin in eastern Wisconsin, and retail dealer in Milwaukee county, has been awarded the first division prize of \$1,000 by the Franklin Co. for leading all individual salesmen in the United States in the sale of new cars in June. He scored 525 points by making 19 retail sales and deliveries personally. J. M. McGuinness, of Boston, ranked second with 425 points. Mr. Williams also won first place in the Northwestern division, embracing nine states and three Canadian provinces.

Gasoline Stocks Increase 55,000,000 Gallons in May

Washington, Aug. 5—Production of gasoline continues to increase, as refinery statistics issued by the Bureau of Mines show that the daily average production of gasoline for May was 14,469,931 gals., which is 262,758 gals. larger than the production for the preceding month, and an increase of 1,129,640 gals. over the daily average production for the year 1920. Stocks on hand at the refineries were increased by 55,272,887 gals. over stocks of April 30. The May exports of gasoline amounted to 39,858,771 gals., while domestic consumption amounted to 354,263,486 gals.

The daily average consumption of gasoline for the month of May shows a decrease of 318,120 gals. from that for the month of April, also a decrease of 1,703,413 gals. from the daily average of May, 1920. This decrease over last year is accounted for by a decrease on both exports and domestic consumption.

The daily average production of kerosene for May was approximately 520,000 gals. less than the production for April. Stocks of kerosene decreased about 6,000,000 gals. during the month of May.

During May the daily average production of gas and fuel oils was about 800,000 gals. a day less than the average for April. May stocks of these oils were increased by 107,000,000 gals.

The daily average production of lubricating oils, during the month of April was approximately 300,000 gals. less than the production for the month of April, while the stocks for the period were increased 12,000,000 gals.

WASHINGTON BODIES TO UNITE

Spokane, Aug. 5—Negotiations contemplating a consolidation of the Washington Automobile Chamber of Commerce and the Washington Automotive Trades Assn. was the most important subject discussed at the annual meeting of the latter association. The consolidation is expected to create a body of greater power.

The following executive committee was elected to carry on the work for the coming year: George Gunn, Jr., chairman; A. S. Eldridge, P. E. Sands and C. H. Shields, Seattle; Fred Chandler,

R. S. Abbott, for the past 10 years manager of the Atlanta district for the Ford Motor Co., and in charge of the large assembling plant in Atlanta, has been promoted to the management of the district, with headquarters at Houston, Tex. This district includes a large part of Texas and all of Mexico. Abbott is succeeded here by W. W. Mitchell, for the past two years assistant manager of the assembling plant at Oklahoma City.

J. Walter Drake, will represent the N. A. C. C. on a special committee appointed by the National Ass'n of Manufacturers to cooperate with the Bureau of the Census in compiling the 1921 biennial census of manufacturers. In addition, the statistics as to production will be given the bureau for publication monthly.

Yakima; A. C. St. John, Chehalis; Harry L. Olive, Spokane, and L. W. Harkins, Tacoma. L. J. Titus, Centralia, was elected president and E. C. Finlay, Spokane, vice-president. Olympia was selected for the 1922 convention city.

The concluding act of the convention included an indorsement of the Townsend bill.

TWO NEW TRACKS FOR COAST

San Francisco, Aug. 6—Automobile racing will receive encouragement on the Pacific coast this winter by the addition of speedways at Santa Rosa, about 80

miles north of San Francisco and at Tanforan just below on the peninsula.

The new tracks will be a mile and a quarter in length and will compare favorably with the speedways at Fresno, Los Angeles and Tacoma.

It is probable that races on these tracks will be confined to elimination sprints of 25 miles and a final race of 50 miles, as racing fans like the excitement of several thrilling finishes.

Highway Trailer Co. Fires Suggest Work of Fire Bug

Milwaukee, Aug. 8—Wisconsin state fire insurance and fire prevention authorities are of the opinion that an incendiary is working to wreck the plant of the Highway Trailer Co. at Edgerton, Wis. On the night of July 4 fire destroyed an assembling building and warehouse, 190x960 ft., causing a loss of more than \$250,000. Investigation developed suspicions of incendiarism. Friday evening, July 29, another mysterious fire occurred, causing a loss of \$25,000. Blazes were found simultaneously in several parts of the building. Officials of the Highway company immediately summoned the state fire marshal, several inspectors and provided bloodhounds, but the trail was lost on a road leading out of the city of Edgerton.

35 Cities, 1,500 Buildings, 2,000 Acres to House General Motors

NEW YORK, July 31—The General Motors Corp. is mailing to stockholders with the Aug. 1 dividend checks, an educational booklet telling them something of the magnitude of the corporation. Few persons, even among the stockholders, have any definite idea of the wide ramifications of the great enterprise. The following table shows sales of passenger cars and commercial vehicles by divisions for the past four calendar years:

| Years Ended Dec. 31..... | 1920 | 1919 | 1918 | 1917 |
|-----------------------------|---------|---------|---------|---------|
| Passenger Cars— | | | | |
| Buick | 111,215 | 115,405 | 74,856 | 117,300 |
| Cadillac | 19,826 | 19,801 | 12,279 | 19,692 |
| Chevrolet | 126,397 | 127,362 | 81,435 | 109,111 |
| Oakland | 36,155 | 51,901 | 24,110 | 33,951 |
| Oldsmobile | 25,713 | 33,345 | 18,822 | 22,045 |
| Scripps-Booth | 8,779 | 8,128 | 4,008 | 2,545 |
| Commercial Cars— | | | | |
| Chevrolet Trucks | 13,651 | 6,098 | 384 | 2,664 |
| GMC Trucks | 5,137 | 7,729 | 8,998 | 5,861 |
| Oldsmobile Trucks | 8,239 | 7,782 | 30 | 15 |
| Totals— | | | | |
| Passenger Cars | 328,085 | 355,942 | 215,510 | 306,644 |
| Commercial Cars | 27,027 | 21,609 | 9,411 | 8,540 |
| *Miscellaneous | 36,421 | 28,607 | 21,913 | 11,319 |
| Grand Total— | | | | |
| Cars, Trucks, Tractors..... | 391,533 | 406,158 | 246,834 | 324,503 |

*Consists of tractors; McLaughlin, Chevrolet and Olds cars produced and sold in Canada, and therefore not included in reports to National Automobile Chamber of Commerce; and also Buick and Cadillac commercial cars.

The corporation has 78 divisions, subsidiaries and affiliated companies in 35 cities of the United States and Canada. These plants embrace more than 2,000 acres of land upon which there are over 1,500 buildings with a floor space of more than 32,000,000 sq. ft. The Buick plant at Flint, which covers 200 acres, is 1½ miles long and ¼ mile wide. The new Cadillac plant at Detroit covers 46 acres. The central office building in Detroit is the largest office building of the kind in the world and contains 1,400,000 sq. ft. of floor space.

In addition to the manufacturing plants, the various divisions have large investments in factory branches, service stations and retail stores in all the principal cities of the United States and Canada. Chevrolet alone has 38 retail stores. Every city of importance in the world is covered by the General Motors Export Corp. and other foreign organizations of the corporation.

The Accessory Show Case

New Fitments for the Car

Slow Speed Brush Is Feature of New Timer

A new non-wearing timer for Ford cars and Fordson tractors is characterized by a brush made in the form of an annular ball bearing having an outer circumference more than half as large as the inner circumference of the timer shell. This has the effect of so slowing down the outer ring of the bearing that it makes only one complete turn to six revolutions of the camshaft. The claim is that at this rate is approximately one-thirtieth of the speed made by the rollers of the conventional types of timers, the device will outwear the latter many times over.

Explicit directions are given with the new timer to the effect that it must not be lubricated with oil, but only with vaseline or castor oil every 3,000 to 5,000 miles. The lubricant is not applied to the shell or contact pieces, but directly to the balls of the bearings. The reason for this is that the object is to keep the fiber insulation of the shell and also the steel contact segments dry and clean. Owing to the large circumference and area of the outer ring of the bearing, it is claimed that the destructive hammering and chopping of the fiber ring is eliminated. The device is priced at \$3.50 and is marketed by the Nelson Timer Co., Inc., 711 Chestnut St., Milwaukee.

Automatic Safety Signal Tail Light

Believing that, after all, the "man behind" is not nearly so much interested in the direction the driver of the car in front is going to turn as in being informed in advance that he is going to turn, the International Aerial Navigation Co., 1034 No. Vandeventer Ave., St. Louis, Mo., is offering the Keppel Bros. Automatic Safety Signal Tail Light which flashes the word "SLOW" every



Keppel Bros. automatic safety signal tail light

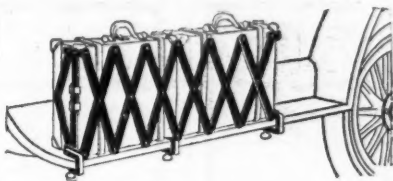


Glas-Co visor

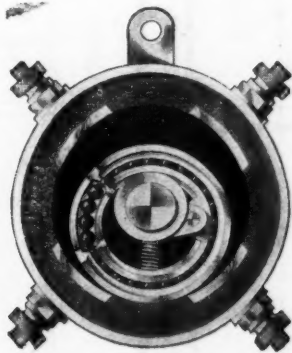
time the clutch or brake pedals are depressed. The device is made in the form of a complete tail light, fitted with the various voltages of bulbs. The wiring scheme is quite simple, and the part easy to install. The glaring red letters of the caution signal are plainly visible for a long distance both day and night.

Glas-Co Visors Relieve Eye Strain

Made of a restful green shade of glass, the Glas-Co windshield visor offered by the Glas-Co Visor Manufacturing Co., 728 W. Madison street, Chicago, is supplied in two sizes—10½ x 40 in. and 10½ x 43 in.—to fit all open cars. It is claimed that the universal fit is possible on account of the quickly adjustable Glas-Co attachments. Although of glass, protected by a sturdy frame, the device is not rigidly mounted but can be raised and lowered in conformity with driving conditions.



Collapsible luggage carrier



Nelson non-wearing timer for Ford cars

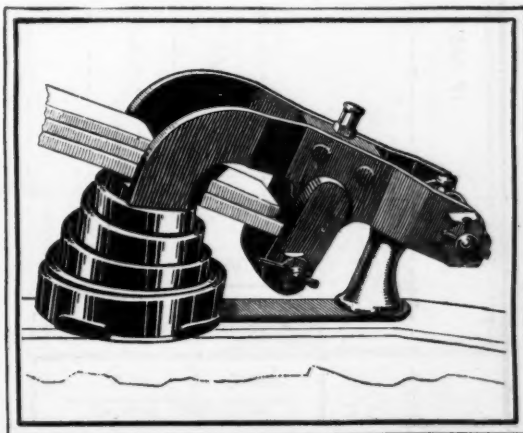
New "Cushion Coil" Shock Absorber

Having proved its merits through the medium of 3,000 test sets installed during the past year, the "Cushion Coil" shock absorber manufactured by the Pressed Metal Mfg. Co., Waukesha, Wis., is now offered to the motoring public through the medium of the accessory and jobbing trade. Made in the volute form, of chrome vanadium flat spring steel, under compression each coil telescopes inside the next larger one until, under heavy overload or shock, the edges of each turn bottom against a clock spring collar, and the whole device becomes no higher than one single turn.

Cushion Coils are claimed not to interfere with the action of the Ford spring leaves and to have an automatic snubbing action which eliminates the unpleasant up-throw resulting from rebound. Finished in a rich, glossy black enamel Cushion Coils present a finished appearance and are easily installed on all models of Ford cars.

Folding Luggage Carrier

A collapsible luggage carrier made by the National Carrier Co., Minneapolis, Minn., is so designed that it will stretch to a length sufficient to fit all cars. It is a clamped on device, no holes being needed for installation. When extended, it rises to a height of 14¾ in. above the running board, which is ample to accommodate the average suitcase. When not in use it can be packed away underneath the rear seat, as, folded, it occupies a space only 7½ by 19 in. It is marketed through the jobbing trade exclusively.



"Cushion Coil" shock absorber

Automotive Architecture

Planning & Building Problems

Conducted by Tom Wilder

Planning Attractive Storage Room

Q—You will find enclosed a rough sketch giving dimensions of the building we want.

The first floor will be devoted to storage and accessory sales, but we will not want a salesroom for cars. Please arrange ladies' restroom and toilet, general office and gas and oil handling features.

Our second floor will be double decked to take care of 200 cars or more in dead storage.—Creek Motor Sales Co., Milwaukee, Wis.

You have been very liberal in laying out your live storage room and its wide aisles should make it a very attractive place. After the space for posts is taken out however, there will not be quite as many car spaces as you anticipated.

In our June 2 issue we printed a diagram of the flatiron forms and in this plan the posts are spaced so that three forms can be placed between each two posts. The width of the post must, of course, be added to the space between the forms where the posts occur.

We have suggested a cross aisle back of the office as the logical location for the gas and oil supply. Here it is handy to the office and accessory store and will not interfere with traffic in and out of the building.

Instead of double decking your second floor why don't you build two distinct floors the lower one with a very low ceiling and the upper with more head room? In the course of a couple of years the labor cost of building frame work and raising cars into upper positions will

Automotive Architecture

IN this department MOTOR AGE aims to assist its readers in their problems of planning, building and equipping service stations, garages, dealers' establishments, shops, filling stations, and in fact any buildings necessary to automotive activity.

When making requests for assistance please see that we have all the data necessary to an intelligent handling of the job. Among other things we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected they will be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repairshop.

And how much of an accessory department is anticipated.

hit-and-miss but in reality it is not, the posts being so spaced that cars may be placed between them without waste. It will be seen that they are in tiers from front to rear and the best plan of construction would call for a girder surmounting each tier. The reinforcing of the floors would be across these girders and so, independent of the posts.

Sales and Service Building With Large Garage

PLAN 355

We own a location on one of the main streets and want to erect a building to be absolutely modern and convenient above all else. It is in a semi-residential district, so necessarily the front will have to be somewhat finished. We expect to incorporate the following departments with special details as listed below:

Machine and repairshop—three to five mechanics.

Auto laundry.

Salesroom—five cars and one truck.

Office space.

Storage—as many cars as possible.

Battery service.

Tire service.

Accessories salesroom.

Auto topping and repairshop.

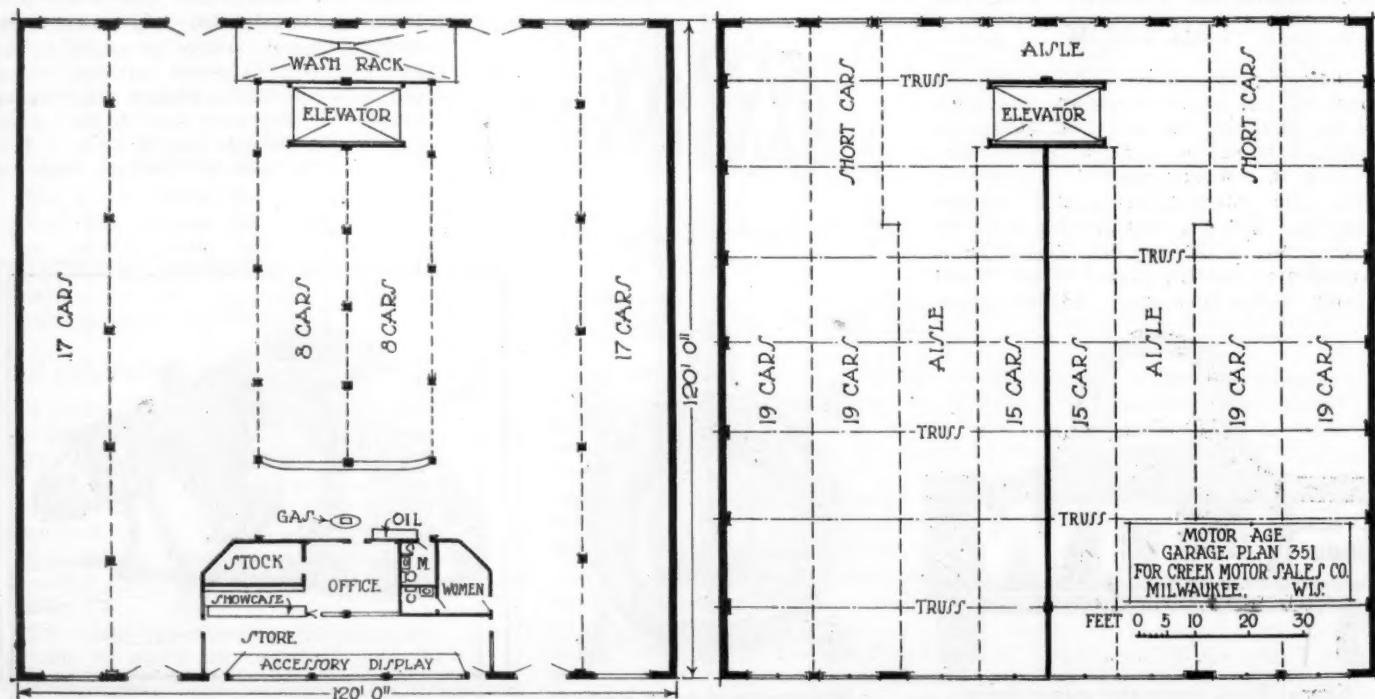
Paintshop. Electric oven—and paint-room.

Spare parts department.

The building will be built to include a basement beneath the entire building and two stories above. The price of building will be between thirty and forty thousand dollars. If in your judgment these various

pay for the extra floor. Besides that, the upper floor will make an ideal shop location if you should decide to do repairing some time in the future.

The column spacing appears rather



A storage garage with dead storage on second floor and live storage on first floor

departments cannot be installed and still retain the above price, please suggest with what to dispense.

We frankly admit that this is the most difficult plot we have ever run across upon which to arrange a satisfactory plan for a building of the scope you desire.

It would be very simple to lay out a plan if it were not for the fact that the building needs supports and these supports must be above one another on the different floors. They must also be spaced in such a manner that there will be no waste space; that is, so that cars will not come in aisles, nor be spaced so far apart that costs will be excessive, nor so close together that they will hamper movements.

We have devoted the whole of the basement and the rear end of the first floor to storage, altogether accommodating 58 cars. The only connection between this department and the others is through the accessory store and by way of the stairs to the basement. If garage customers want service they must come into the service entrance where they meet the manager or trouble shooter. They may buy accessories handily and get parts by going to the second floor. They cannot get into the shop, however, without the approval of the shop superintendent or his clerk stationed in the small office at the head of the stairs.

To make storage customers more independent we have connected the first floor and basement garages by a ramp so that there will be no need of their patronizing the elevator, it being for service use only.

The laundry is under the sidewalk in the basement where it gets good light and uses space otherwise of little value.

The shops are all on the top floor; the roof of the main car repairshop being trussed to do away with all the posts and make car handling easier. There are short trusses also over the paintshop eliminating one row of posts.

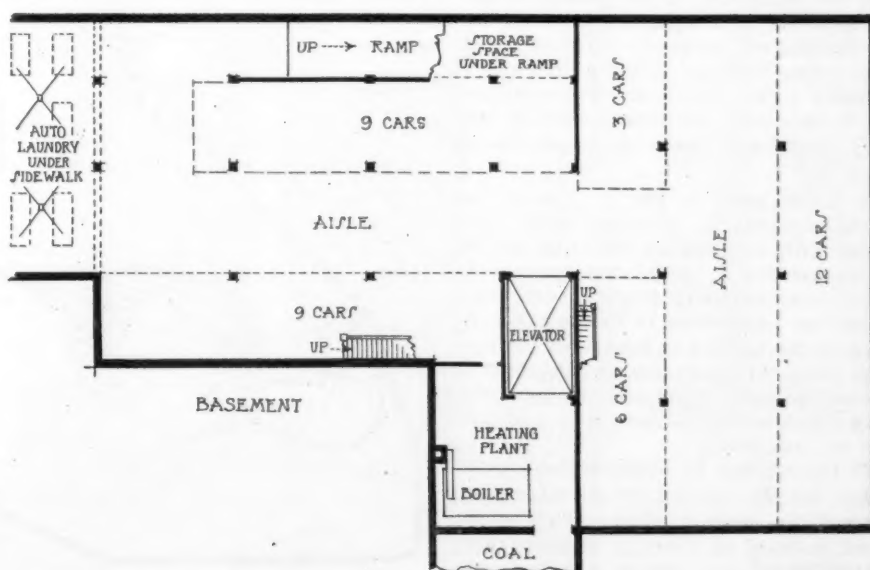
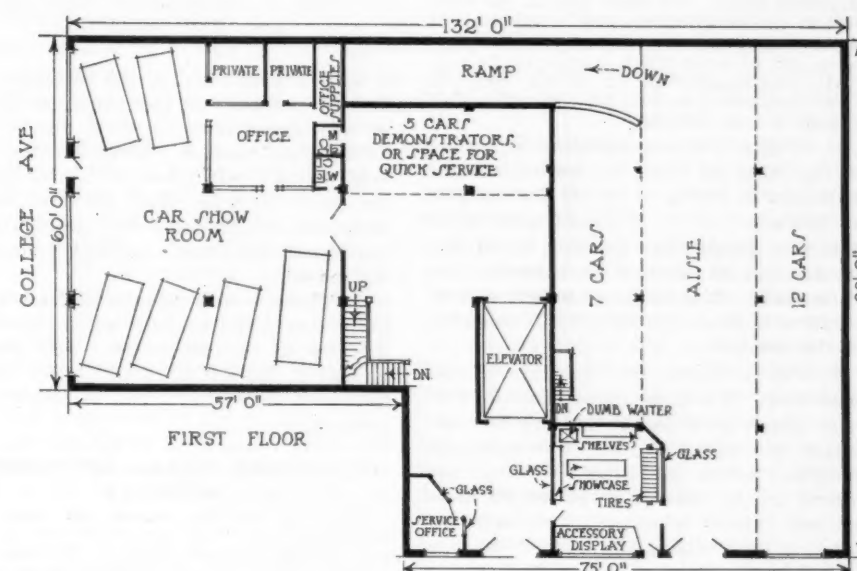
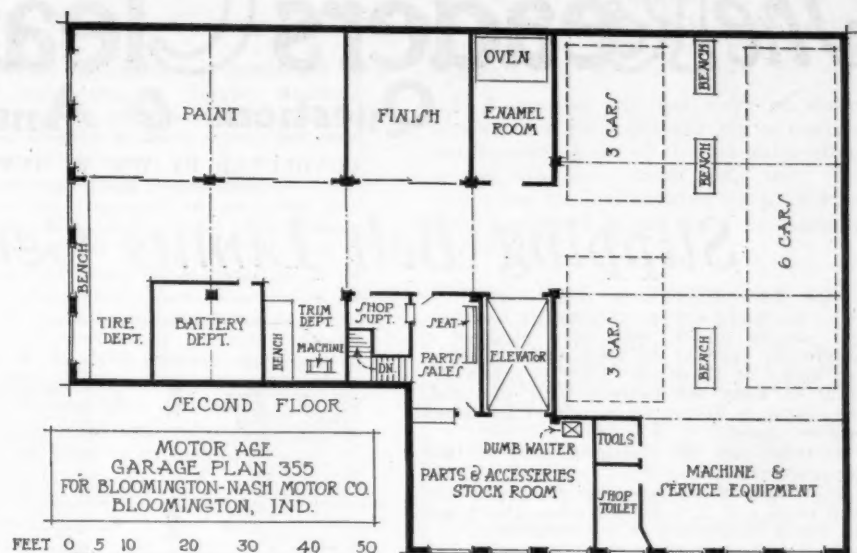
The ramp could be made longer except that it would not have headroom where it passes down under the office. If it is made longer one of the private offices must be cut off. The second floor will depend for most of its light upon well located skylights of which there should be quite a number, there being very little window light available.

The basement will depend wholly upon artificial light as will the back 60 x 75 ft. square of the first floor, and ample provisions should be made in wiring these sections.

FORTY MILLIONS IN ROADS

San Francisco, Aug. 6—Twenty million dollars, the largest sum ever expended in one year by the Federal government on the Pacific coast, will be put into roads in this section this year. The western states — Washington, Oregon, California, Wyoming, Colorado, Montana, Idaho, Nevada, Utah, Arizona and New Mexico, will expend the same amount. Many of the roads will be 20 feet wide and of concrete six inches thick, much heavier than the highways heretofore built by the states themselves.

There Is An Art in Utilizing Space



A very complete general sales and service station of three floors with ramp to the basement storage floor and elevator to all floors

The Readers' Clearing House

Questions & Answers

CONDUCTED BY WM. H. HUNT
Technical Editor, Motor Age

Slipping Belt Limits Generator Output

Q—We have a type GB Auto-Lite Generator which will only produce a maximum current of four amperes at a car speed of 30 m.p.h. This is not sufficient to keep the battery fully charged. Generator is driven by a belt at 1.7 times engine speed.

2—How can the charging rate of this generator be changed?

3—Will you explain why the generator will burn out if it is run when there are no wires connected to its terminals?

4—As an experiment we placed a 6-8 volt 32 cp. light across the terminals of the generator and it did not show the slightest glow. We then placed an 18-24 volt 27 cp. lamp across the terminals and it burned brightly. Why did the first lamp fail to burn when connected to generator terminals, as it burns brightly when connected to battery circuit?—A. J. Gumm, Marseilles, Ill.

1—If this is a new installation we are of the opinion that the pulley on the generator is too large or the driving pulley too small. If it is an old installation it is very likely that the belt is slipping on account of stretch or because it is oil soaked. At any rate an output of four amperes is far below the normal capacity of the machine.

2—Fig. 1 shows the windings of the generator. It will be noted that the current which goes to the battery is compelled to travel around the windings marked "series windings." These are wound in the reverse direction to those marked "shunt windings" and have the effect of neutralizing the magnetism generated by the latter. Therefore, the only way in which the output of the generator can be increased is to remove a few turns of the reverse series windings until the desired output is attained, or to take the current directly from the brushes. This last is not recommended as it cuts out regulation entirely and very likely will cause the apparatus to burn up.

3—Refer again to Fig. 1. One of the leads marked "to terminal post" connects with a screw in the iron of the generator frame while the other connects to an insulated binding post which forms the connection to the battery. So long as the battery is connected the current from the generator is compelled to travel through the reverse series windings which effect the regulation and hold the current down.

If the battery is removed there is no place for the current to go other than through the shunt windings which causes them to build up a strong magnetic field which, in its turn, causes a still greater generation of current and so on until the value rises so high that the windings are burned out. On the other hand, if

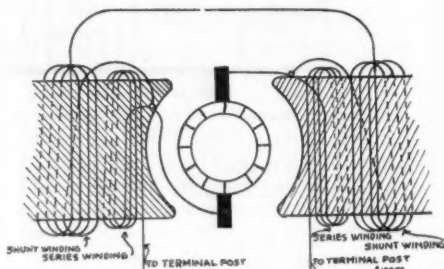


Fig. 1—Windings of Auto-Lite generator, model GB.

a wire is connected to the terminal post and to the iron of the generator frame or any other metal part of the engine, an exterior path is offered for the current which it will travel and in so traveling pass through the reverse series windings, neutralizing the magnetism of the shunt windings and thus protecting the machine.

4—There is no reason why the 6-8 volt bulb should fail to light when connected directly to the generator. The wonder is that it did not burn out. We believe that you must have had a faulty connection.

GENERATOR BUILDS UP CURRENT SLOWLY

Q—What is the reason an Auto-Lite generator used on an Overland 4 does not charge at low speed? It does not charge until a speed of 10 to 30 m.p.h. is reached, when it starts at a very low speed and charges as high as 20 amp. The

trouble is in the generator, as it was tested with the wire removed from the terminal. The commutator has been smoothed and the field coils reinsulated but with no result. The brushes are in good shape and there is no ground in either the field or the armature. The field coils have not been tested for short circuit, neither has the armature. The trouble is most apparent when the engine is cold.—Miller Bros., Wenatchee Garage, Wenatchee, Wash.

"When the engine is cold"—this we believe supplies the clue to the trouble and suggests to us that possibly the brushes are not in quite as good a condition as they are thought to be. Once a brush has absorbed oil a semi-insulating coat is formed on its face every time it gets cold. This is especially true of the soft carbon third brush. While we can hardly believe you have worked on this generator without cleaning the brush holders and all connections, still this is possible and we would suggest that you check these parts over, carefully removing all gummy substance that may be found and brightening them with emery cloth before reassembling.

You said that the commutator has been smoothed up but you fail to mention whether or not it has been undercut, that is to say whether the insulation between the segments has been trimmed down to below the level of the latter. If this has not been done we recommend that it be attended to.

Fig. 2 shows an internal view of the generator and how the third and main brushes are connected to the field wind-

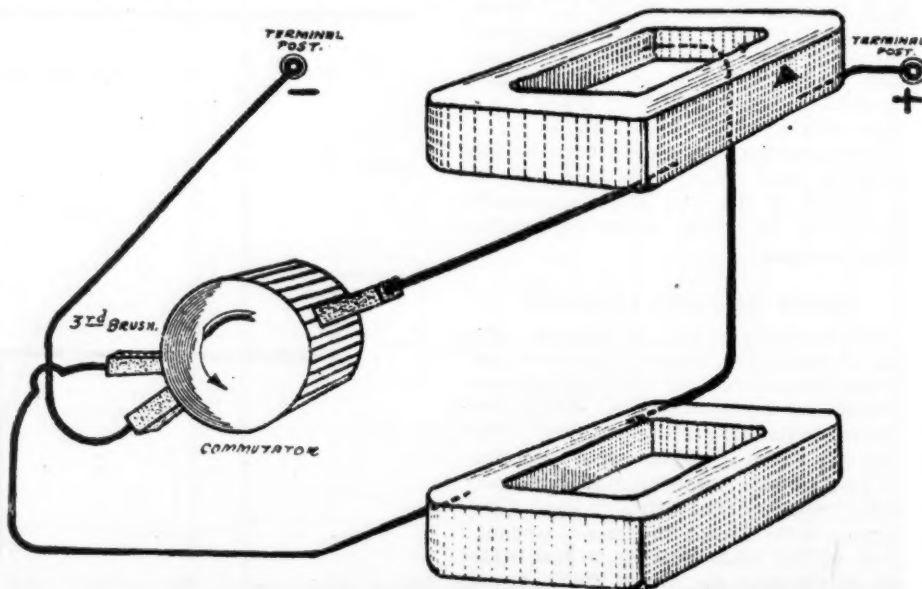


Fig. 2—Arrangement of the field windings and connections of the Auto-Lite generator used on Overland 4

ings. Were it not for the residual magnetism in the iron of the field the generator would not start to generate at all unless the fields were magnetized from some outside source. Although the magnetism is always present it is very weak and creates but a faint current in the armature when the generator first starts. If there are any high resistance connections, such as dirty or glazed brushes, dirty or gummed connection and the like the low voltage initial current is not strong enough to overcome them and cause the fields to build up in magnetism; consequently, the generator remains inoperative. Besides the suggestions outlined above we would further suggest that you examine and thoroughly clean the ground connection of the grounded main brush.

CONSTRUCTION OF MAGNET CHARGER AND "GROWLER"

Q—How much wire and what size should be used to construct a 110 volt D. C. magnet charger? What size iron core?

2—How would you construct a 100 volt D. C. "growler" for testing armature of automobiles? Give size of wire and amount necessary.—H. M. Seelan, Springfield, Mass.

1—Suitable magnet chargers may vary in size, design and construction. The following details were carefully calculated so that the resulting electromagnet will give the required field strength to properly recharge magnets. Its construction is as follows: a brass tube about 1/16-in. thick at the side and 7 1/2-in. long is made with a 1 1/2 in. hangover, 1/4-in. thick as shown in Fig. 3. The hole through the center is a fraction over 1 in. in diameter.

Tubes of this sort cannot be bought anywhere; they must be made. If the details are given to a tinsmith he will be able to make one. The cores are of soft iron and are cylindrical and drilled at the bottom as shown. They are to be one inch in diameter and 8 1/2 in. long. The rest of the apparatus consists of a semi-hardened steel base plate 4 1/2 by 9 in., and two blocks of semi-hardened steel 1 1/4 by 2 by 4 in., drilled as shown to receive set screws. Besides this equipment 22 pounds of insulated 20 B. & S. gage copper wire is necessary.

The first step is to wind 11 pounds of wire around each brass tube, winding one coil one way and the other the opposite way. The best way is to leave about one foot of wire over when starting to wind; and with the ends a suitable connection between the coils may be made. After both coils have been wound very tightly lead off the ends. Then shellac the coils and over the shellac wind insulating tape.

Place these coils on the metal base plate in such a way that the distance between the outer diameter will be about 1/2-in. Then, with a long center punch, mark a point on the base plate in the center of both coils. Two holes should be drilled into the base plate. The object of the holes is to hold the cores in position. Fit the cores over these holes and slip the coils over the cores. If necessary break the connection between

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of **MOTOR AGE** is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. **MOTOR AGE** reserves the right to answer the query by personal letter or through these columns.

Emergency inquiries will be replied to by letter or telegram.

the two coils and connect them later. Now the cores are in position in the coils and the latter are on the base plate. Next attach the top pieces.

These should be drilled in the center and held against the cores by set screws. The entire apparatus is then placed upon the wooden base. The two ends of the cores are attached to a 110-volt direct current circuit. In recharging, the magnets are placed upon the top pieces.

The length of time to recharge is less than one minute. When the magnet, if it be an ordinary magneto magnet, such as used on the majority of four-cylinder or six-cylinder motors, is able to lift and hold a weight of 15 pounds, charging is complete. In charging stroke the magnet across the charger five or six times and then remove it for the lift test. If it will not lift about 15 pounds repeat the stroking. The magnets should be assembled on the magneto as soon as

they are charged or protected with a piece of soft iron across their poles. If this keeper, as it is called is not applied some of the magnetism will be dissipated.

2—A growler will not work on direct current as a rapid alternation of current is necessary to set up the inductive effect in the armature undergoing test. Instructions for the making of a growler were published in the July 21 issue of **MOTOR AGE**.

RESTORING A GENERATOR TO CORRECT POLARITY

Q—Explain the proper way to go about bringing a generator to correct polarity when it reverses. We have a great deal of this trouble.

2—Explain what may cause a generator to reverse polarity.—H. M. Borkhorst, Rockford, Ill.

We will reply to your query in the reverse order to which it was made.

2—It is rare for an automobile generator to reverse polarity and is caused invariably by connecting the battery up improperly. Many persons fall into the error of supposing that the generator is reversed when in reality the reversal is of the "charge, off, discharge indicator." These instruments are usually made with permanent magnets which frequently reverse. Before condemning the generator it is best to check the polarity of the current output with a voltmeter.

1—If it is positively known that the generator is reversed it can be brought back to correct polarity by closing the points of the cutout by hand for 20 or 30 seconds before the engine is started. This sends a strong current round the field windings in the proper direction and establishes the polarity of the residual magnetism of the pole pieces. A strong, freshly charged battery should be installed for the job.

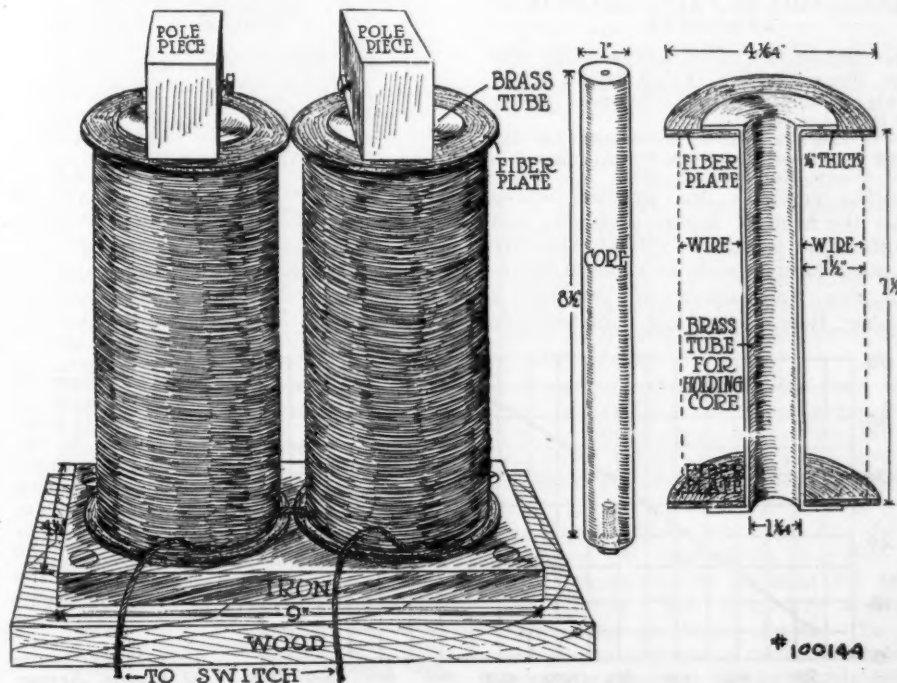


Fig. 3—Details of a magnet charger. Note the square pole pieces are movable, being attached to the cores by set screws.

ENGINES

NOTHING SEEMS TO STOP ENGINE HEATING

Q—What causes a 1917 Ford car to overheat? After running about two or three miles it will start to boil. There is nothing wrong in the cooling system, as we have cleaned the radiator and the fan runs well. Both light and heavy oil have been tried, but neither seems to make any difference. The spark is kept retarded as much as possible, but that does not help. We have also cleaned out the carbon, ground the valves, and put in a new set of the regular Ford piston rings. Is it possible that the front cylinder cannot be getting enough oil? If not, what can be the trouble?—John Paulson, Hilland, S. D.

By keeping the spark retarded you doubtless mean that you keep the lever pulled back. This is not the retarded but the advanced position, and is correct. It is barely possible that the oil feed pipe is partially clogged up, but we rather question this, as burned-out bearing should have resulted before this time if it were true.

It can be checked easily by overloading the engine with oil so that you can be certain that the connecting rods are dipping into it. If this remedies the heating it indicates that the oil feed system is at fault. When such is the case the number one cylinder is the least likely to suffer, as it gets the oil first. If the engine has been disassembled lately it is quite possible that it is timed a trifle late. This point should be checked. You do not state what steps were taken in cleaning the radiator. A strong solution of lye water will clean out scale, and the muriatic acid-baking soda treatment will clean out the residue of anti-freeze solutions.

CALCULATION OF VALVE DIAMETERS AND LIFTS

Q—Publish the valve diameter and also what the valve lift should be on a $3\frac{1}{2}$ by $5\frac{1}{2}$ in. engine to get the most power and the best results.

2—Is there a standard formula for figuring valve specifications in an engine?—R. M. Clary, Kansas City, Mo.

1—The reply to this question comes under the head of engine designing and is difficult to formulate without knowing the other factors such as valve arrangement, size and shape of combustion chamber, type of cam and cam follower

it is desired to use, and like points. However, a very successful high speed engine of the dimensions given has valves of 1.9375 in. diameter, in the clear, and a lift of about $\frac{3}{8}$ -in. Another popular make used a 2-in. valve with a $\frac{3}{8}$ -in. lift while another has valves of $1\frac{1}{4}$ in. diameter and only $11/32$ -in. opening. The size and the lift are governed by the speed of the gas at maximum engine speed. This has been found to be about 14,000 ft. per minute.

2—Yes, two or three, but they are too lengthy and complicated for publication in these columns. They are very clearly worked out in "Motor Vehicle Engineering" by Ethelbert Savary, published by the McGraw-Hill Book Co., Inc., 239 West 39th street, New York and the "Gasoline Automobile," Volume 1, P. M. Heldt, Nyack, N. Y., author and publisher.

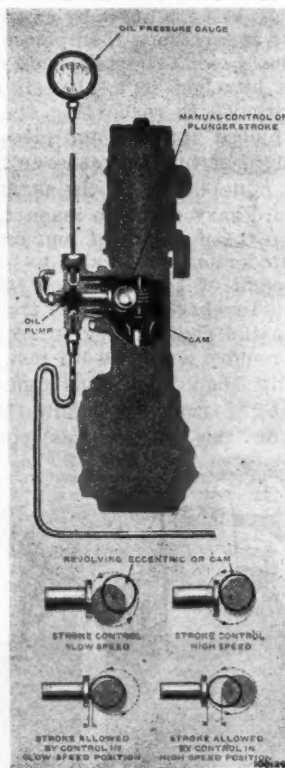


Fig. 4

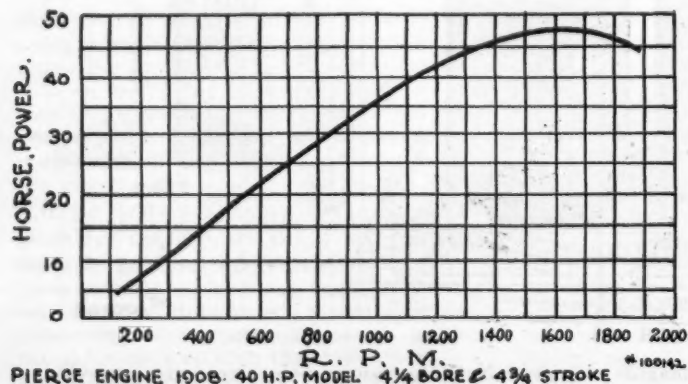


Fig. 5

Above: Views of the oil pump of the Model O Hudson car. At the bottom is shown how the shifting of the cam lengthens or shortens the stroke of the pump plunger.

Left: Power curve of Pierce Arrow, 1908 $4\frac{1}{4} \times 4\frac{3}{4}$ engine.

READER EXPRESSES APPRECIATION

Q—Thank you for yours of June 30th. I found the transmission trouble and by putting the thrust washers in their proper places overcame it. I have just one more trouble and that is the oil pump on a Model O Hudson. This does not work at all except when engine is cold. How do I adjust it?—R. B. Halle, Lukachukia, Ariz.

"When the engine is cold" is the clue to your difficulty. We think it quite likely that you have been practicing false economy common to most motorists, namely, that of not changing the crankcase oil as frequently as it should be changed. Unless this is done the oil becomes contaminated and thinned by the heavy portions of the fuel which, failing to burn, pass the pistons. This effect is much greater in the older engines than in the later types for the reason that the fuel is not so completely vaporized by the older types of carbureters and for the further reason that the cylinders are usually worn out of round to a rather wide clearance.

We believe that if you will change the oil at least every thousand miles you will find the circulation to be satisfactory. Using a heavier grade of oil may also help. A sectional view of the oil pump and the positions of the pump drive cam eccentric is shown in Fig. 4. The eccentric is interconnected with the carburetor throttle linkage in such a way that as the carburetor is opened the cam position is changed to give the pump a longer stroke and consequently cause it to pump more oil. An investigation of the interconnecting linkage will quickly determine whether or not the cam is moving with the throttle as it should.

POWER CURVE OF EARLY PIERCE ENGINE

Q—Publish the power curve of the Pierce six cylinder engine having a bore of $4\frac{1}{4}$ in. and a stroke of $4\frac{3}{4}$ in. This was a T-head engine. If you cannot give us the power curve, tell us at what speed it developed its maximum power.—W. R. Smith, Lost Nation, Ia.

See Fig. 5. The Pierce-Arrow Motor Car Co. informs us that this is a 1908 engine which developed 36 b.h.p. at 1000 r.p.m. and a maximum of 48 b.h.p. at 1700 r.p.m.

WANTED: 200-HP. RACING CAR

Q—We wish to trace a racing machine of European make which we know is at present in America and which was offered for sale in the spring. We have unfortunately lost the address of the owner. Will you please give us some advice as to the best means of doing this?

The car we want is 200 hp. Benz (German) racer, 4 cylinders, bore 185 m.m., stroke 200 m.m. We know that only one model of this car came to this country.—Richard Cooper, Majer, Laramie, Wyo.

Since this car was advertised it has dropped out of sight and we are unable to advise you where it may be found. Perhaps one of the thousands of MOTOR AGE readers will oblige with the desired information.

SQUARING THE ENDS OF VALVE STEMS

The ends of valve stems can be quickly dressed true by inserting a file between them and the push rod and turning the valve as in grinding, revolving it through a full circle several times.

MISCELLANEOUS

HOW MUCH GASOLINE WASTE FROM "GRAND-STAND DRIVING"?

Q—Give us your opinion concerning the following:

1—The average waste per year of gasoline per automobile and truck, due to unnecessary and extravagant use of the accelerator?

2—Injury and strain to tires and mechanical parts by reason of sudden increased speed due to unnecessary application of the accelerator? What we are trying to determine is the average cost per year to each motor-driven vehicle through wasteful use of the accelerator.—W. S. Hannah, Kansas City, Kan.

The unnecessary use of the accelerator with the attendant sudden speeding up of engines from their minimum to maximum speeds would form material for a lengthy editorial, did we not have more important subjects to consider. The figures for which you ask are not available, but suffice it to say that the waste probably runs into hundreds of thousands of gallons of gasoline per year, to say nothing of the enormous strains to which the engines and chassis are subjected by the idiotic practice.

Still, after all, a certain class of motor car owners derive more pleasure from the exhaust racket of an overspeeded engine than they would from the smooth, efficient road performance of their cars. This and the fact that all persons are guaranteed liberty in their pursuit of happiness makes it quite likely that the vast army of conservative drivers will have to suffer from the selfish lack of consideration of the few for many years to come.

EXPECTING TOO MUCH OF AN OLD CAR

Q—We have a model "J" Hudson speedster which we have overhauled with the exception of the installation of new pistons, valves and tappets. We put in new rings, tightened the bearings, ground valves and timed it up, but it still gets noisy on a hill and does not have the power and getaway it should. We want to make it as fast as possible without installing large valves.

If we rebore the block and fit light gray iron pistons would it improve the speed? Would you recommend new valves? The valve stems are worn a little and probably leak air. We have installed new guides. What make of pistons would be best for this job? Are the DeLuxe pistons, made in Los Angeles, good? When installing pistons, etc., should the cylinders be rebored to a tight fit and the pistons lapped in by hand? The car has the original carburetor on it. Would you use a new one or do these wear as fast as the others?

This car has 33 by 5 in. tires on rear and 32 by 4½ in. on front. Would we get about the same speed with the same size on rear as front? It has made 73 miles an hour with standard tires all around, but since overhauling and putting on larger tires we can get but 67 miles per hour. We made this time with top up and windshields closed and believe it would have done better if it had been held open for a little ways further. We want to get the maximum speed from it. Where will be the best place to get the pistons for this? We failed to say anything about the clearance that the pistons have. They have anywhere from .015 to .020 in. and we had to cut down the rings

installed to get them by the high places.—Ned R. Stuart, Kernersville, N. C.

We believe you are expecting too much from an old car. It is remarkable that you have been able to attain a speed of 73 m. p. h. and we would suggest that you be satisfied with this accomplishment. Of course you can probably attain a greater speed if you will rebore the block and fit the light pistons. We would also suggest that you at least ream the valve seats to soundness and install the new valves.

It is counter to our policy to recommend any particular make of piston, but the one you have mentioned, we understand, is giving very good service. The best method to pursue when installing new pistons is to have the cylinder block reground and, if possible, lap the new pistons into an old cylinder of the right size rather than into the newly reground one. If the old carburetor is giving good results we recommend that it be retained.

On hard roads with the tires pumped up to the proper pressure the larger sized tires should make no difference in the speed. We would recommend that you purchase the pistons from some nearby dealer such as you have suggested. If they cannot be so handily procured, a letter to any of the concerns advertising

these parts in the columns of *MOTOR AGE* will bring full information. Clearances of .015 to .020 are entirely too much, and doubtless account for the noise the engine makes in getting away. Again we would urge that the block be refinished and new pistons installed.

Mystery Tale

Stripped Worm Gears Break Distributor Rotor Pin

You may tell the reader with the broken distributor pin that he will find a jammed or stripped place on the worm gear that drives the distributor. We have been through the mill and know.

Lincoln Garage,
Tama, Ia.

(Well! Well! Here is another ghost laid. If this keeps on there will soon be no skeletons left to rattle their bones in the closet, but they will all be on dress parade where each reader can pick out his favorite skeleton and have it out with him, man to man, as it were.—Ed.)

SHOULD FIVE-PASSENGER CAR BE GEARED UP?

Q—Do you consider it advisable to put a three-to-one gear in a Ford car? Will it have a tendency to jerk when running slowly? A desire for more speed is the reason for the contemplated change.—Verne Evans, Watseka, Ill.

The higher gear will, of course, give you better speed on a long, straightaway course, but will handicap you for hill climbing. If the engine is kept tuned up to top-notch condition all the time, there should be no jerking when attempting to run slow, although naturally you cannot expect to throttle down so slowly as with the standard gear. We have reports of others having made the change with perfectly satisfactory results.

WHERE TO GET FORD RACING CAR PARTS

Q—Furnish plans and specifications of several type of Ford racers, and also information on building a Ford racer, in regard to undersliding, overhead valve system, carburetor and the like.—R. A. Mason, Welsh, La.

We have a great mass of data on the rebuilding of Ford speedsters and racing cars, but to attempt to publish the details of several types is impossible on account of lack of space. We would suggest that you communicate with the manufacturers of the overhead valve heads, camshafts, special pistons and connecting rods, bevel gears and undersliding parts.

Inquiries addressed to the Rajo Motor Co., Racine, Wis., or the Laurel Motor Co., Anderson, Ind., will bring full descriptive matter of the parts and the specifications covering their installation and the rebuilding operations. For speedster bodies we refer you to the Kuempel Co., Guttenberg, Ia. This concern specializes on patterns for speedster bodies. The plans are drawn to full scale on large sheets. To use, the sheets are pasted upon the material, which is then cut out by simply following the lines. The patterns range in price from \$3 to \$5.

Mystery Tales

HAVE you ever had a little mystery in your shop? Most everybody has. For instance, one reader called up the editor and asked why the small pin through the top of the distributor shaft which drives the rotor brush of a well known make of high tension distributor, keeps breaking. He has used six, the last one of which was especially made of tool steel and case hardened. As this part bears no strain the breakage constitutes a mystery. The solution of it may be found by some clever mechanic in Bangor, Tal-lehasse, Walla Walla or Okmulgee. When it is found, the finder will please oblige us with an elucidation.

There are thousands of these inexplicable mysteries (which, by the way, are usually very easily explained) developing daily, and it is the purpose of the "Mystery Tales" column to draw them out. If you are hiding a dark secret which is slowly but surely souring your disposition, sapping your vitality and ruining your life, drag the pesky thing out into the sunlight and let everybody take a look at it. Perhaps somebody in the crowd has a club up his sleeve in the form of a correct, or at least a plausible explanation, which will lay the thing low and save your sacred reputation. Or, perhaps you have the weapon which may preserve the sanity of some other sufferer. Now, altogether! Send in your mysteries and solutions!

Fan Belt Sizes and Types 1921 Trucks

Motor Age Maintenance Data Sheet No. 162

One of a series of weekly pages of information valuable to service men and dealers—save this page

| Name of Model | Capacity or Rating | Type of Belt | Width of Belt | Length of Belt | Degree of Angle if Vee Type | Name of Model | Capacity or Rating | Type of Belt | Width of Belt | Length of Belt | Degree of Angle if Vee Type |
|---------------------|--------------------------|--------------------|---------------------|----------------------|-----------------------------------|----------------------|--------------------------|--------------------|---------------------|----------------------|-----------------------------------|
| Dorris, K-7 | 3½ | Flat | 2 | 42 2/3 | ..... | Indiana, 20 | 2 | Flat | 1½ | 26¾ | ..... |
| Douglas, G | 1½ | Flat | 1 | 23 | ..... | Indiana, 25 | 2½ | Flat | 1½ | 26½ | ..... |
| Douglas, H | 2 | Flat | 2 | 27½ | ..... | Indiana, 35 | 3½ | Flat | 1½ | 26½ | ..... |
| Douglas, I | 3 | Flat | 2 | 27½ | ..... | Indiana, 51 | 5 | Flat | 1½ | 34 | ..... |
| Duty | 2 | Flat | 1 | 38 | ..... | International, H | ¾ | Flat | 1½ | 38½ | ..... |
| Erie, A | 2½ | Flat | 2 | 37 | ..... | International, F | 1 | Flat | 1½ | 38½ | ..... |
| Fageol, 1½ | 2 | Vee | 1 2/7 | 31 | 28 | International, K | 1½ | Flat | 1½ | 38½ | ..... |
| Fageol, 2½ | 2 | Flat | 1½ | 34 11/16 | ..... | International, G | 2 | Gear-driven fan | | | |
| Fageol, 3½ | 4½ | Flat | 1½ | 40½ | ..... | International, L | 3½ | Gear-driven fan | | | |
| Fageol, 5 | 6 | Flat | 1½ | 40½ | ..... | J & J, D | 2 | Flat | 1¼ | 33 | ..... |
| Federal, SD | 1 | Flat | 1 | 35½ | ..... | Jackson, B | 3½ | Flat | 2 | 38½ | ..... |
| Federal, TE | 1½ | Flat | 1 | 32½ | ..... | Kalamazoo, G | 1½ | Flat | 1¼ | 40 | ..... |
| Federal, UE | 2 | Flat | 1 | 32½ | ..... | Kalamazoo, H | 2½ | Flat | 2 | 42 | ..... |
| Federal, INE | 3½ | Flat | 1½ | 39 | ..... | Kalamazoo, K | 3½ | Flat | 2 | 42 | ..... |
| Federal, XE | 5 | Flat | 1½ | 39 | ..... | Kankakee, EP | 2½ | Vee | ¾ | 40 | 60 |
| F. W. D. | 3 | Flat | 1½ | 39½ | ..... | Karavan, A | 2½ | Flat | 2 | 34 | ..... |
| Fulton, A | ¾—1 | Flat | 1½ | 36½ | ..... | Kearns, N | 1½ | Flat | 1 | 33 | ..... |
| Fulton, C | 2 | Flat | 1½ | 36½ | ..... | Kearns, H | ¾ | Flat | ¾ | 36 | ..... |
| Garford, 25B | 1¼ | Flat | 1 | 37 7/16 | ..... | Kelly-S, K-31 | 1½ | Vee | 1 | 54½ | 38 |
| Garford, 70H | 2 | Flat | 2 | 34 9/16 | ..... | Kelly-S, K-34 | 1½ | Vee | 1 | 54½ | 38 |
| Garford, 77D | 3½ | Flat | 2 | 39 | ..... | Kelly-S, K-35 | 2½ | Vee | 1 | 55½ | 38 |
| Garford, 77C | 3½ | Flat | 1½ | 42 | ..... | Kelly-S, K-36 | 2½ | Vee | 1 | 55½ | 38 |
| Garford, 68 | 5 | Flat | 1½ | 42 | ..... | Kelly-S, K-40 | 3½ | Vee | 1 | 62½ | 38 |
| Garford, 68D | 5 | Flat | 2 | 41 9/16 | ..... | Kelly-S, K-41 | 3½ | Vee | 1 | 60½ | 38 |
| Gary, GT | 1½ | Flat | 2 | 32 | ..... | Kelly-S, K-42 | 3½ | Vee | 1 | 60½ | 38 |
| Gary, J | 2½ | Flat | 2 | 36 | ..... | Kelly-S, K-45 | 4 | Vee | 1 | 62½ | 38 |
| Gary, KT | 3½ | Flat | 2 | 37 | ..... | Kelly-S, K-50 | 5 | Vee | 1 | 62½ | 38 |
| Gary, M | 5 | Flat | 2 | 39 | ..... | Kelly-S, K-60 | 6 | Vee | 1 | 62½ | 38 |
| G. M. C., K-16 | ¾—1 | Vee | ¾ | 38 | 38 | Keystone | 2 | Flat | 1 | 38 | ..... |
| G. M. C., K-41 | 2 | Vee | ¾ | 36 | 38 | Kimball, AB | 2 | Flat | 2 | 42 | ..... |
| G. M. C., K-71 | 3½ | Vee | ¾ | 36 | 38 | Kimball, AC | 2½ | Flat | 2 | 42 | ..... |
| G. M. C., K-101 | 5 | Vee | ¾ | 36 | 38 | Kimball, AK | 3 | Flat | 2 | 42 | ..... |
| Giant, 15A | 1½ | Vee | ¾ | 37 | 60 | Kimball, AE | 4 | Flat | 2 | 42 | ..... |
| Giant, 16 | 2 | Flat | ¾ | 32½ | ..... | Kimball, AF | 5 | Flat | 2 | 42 | ..... |
| Giant, 17 | 3½ | Vee | ¾ | 37 | 60 | Kissel Utility, U | 1½ | Flat | 2 | 46¾ | ..... |
| Gramm-Bernstein, 15 | 1½ | Flat | 1¼ | 39 | ..... | Kissel Freighter | 2½ | Flat | 2 | 49 | ..... |
| Gramm-Bernstein, 65 | 1½ | Flat | 1¼ | 39 | ..... | Kissel Heavy Duty, H | 4 | Flat | 2 | 52¼ | ..... |
| Gramm-Bernstein, 20 | 2 | Flat | 1½ | 32 | ..... | Kissel Goliath, G | 5 | Flat | 2 | 52¼ | ..... |
| Gramm-Bernstein, 25 | 2½ | Flat | 2 | 39¾ | ..... | Kleiber | 1 | Flat | 1 7/32 | 38 | ..... |
| Gramm-Bernstein, 35 | 3½ | Flat | 2 | 39¾ | ..... | Kleiber | 1½ | Flat | 1 7/32 | 38 | ..... |
| Gramm-Bernstein, 50 | 5 | Flat | 2 | 40¾ | ..... | Kleiber | 2 | Flat | 1 7/32 | 38 | ..... |
| Graham Bros., A | 1½ | Flat | 1¼ | 40½ | ..... | Kleiber | 2½ | Flat | 1¾ | 39 | ..... |
| Hall, 2½ | 2½ | Flat | 1¼ | 32 | ..... | Kleiber | 3½ | Flat | 1¾ | 39 | ..... |
| Hall, 3½ | 3½ | Flat | 1½ | 38 9/16 | ..... | Kleiber | 5 | Flat | 1¾ | 47 | ..... |
| Hall, 5 | 5 | Flat | 1½ | 38 9/16 | ..... | Larrabee, J | 1½ | Flat | 1¼ | 41 | ..... |
| Hall, 5-7 | 5—7 | Flat | 1½ | 38 9/16 | ..... | Larrabee, U | 1½ | Vee | ¾ | 38 | 60 |
| Harvey, WEA | 1½ | Flat | 1 | 32 | ..... | Larrabee, K | 2½ | Flat | 1¼ | 36 | ..... |
| Harvey, WFA | 2½ | Flat | 1¼ | 34 | ..... | Larrabee, L | 3½ | Flat | 1½ | 36 | ..... |
| Harvey, WHA | 3½ | Flat | 1½ | 35 | ..... | Larrabee, T | 5 | Flat | 1½ | 36 | ..... |
| Harvey, WKA | 5 | Flat | 1½ | 35 | ..... | Larrabee, W | 5 | Flat | 2 | 44½ | ..... |
| Hawkeye, K | 1½ | Flat | 2 | 30 | ..... | Luedinghaus, C130 | 1 | Flat | 1½ | 40 | ..... |
| Hawkeye, M | 2 | Flat | 2 | 30 | ..... | Luedinghaus, W144 | 1½ | Flat | 1½ | 42 | ..... |
| Hawkeye, N | 3½ | Flat | 2 | 30 | ..... | Luedinghaus, K-145 | 2 | Flat | 1½ | 39¼ | ..... |
| Higrade, A-18 | 1 | R'nd | ..... | 32 | ..... | Luedinghaus, K-170 | 2 | Flat | 1½ | 39¼ | ..... |
| Higrade, B-20 | 1½ | R'nd | ..... | 32 | ..... | Maccar, L2 | 1½ | Flat | 1½ | 40¼ | ..... |
| Highway, A | 4 | Vee | ¾ | 53 | 28 | Maccar, H2 | 2½ | Flat | 1½ | 41½ | ..... |
| Highway, B | 5 | Vee | ¾ | 53 | 28 | Maccar, M2 | 3½ | Flat | 2 | 37½ | ..... |
| Indiana, 12 | 1½ | Flat | 1 | 38½ | ..... | Maccar, G | 5 | Flat | 2 | 40¾ | ..... |

Automotive Repair Shop

Practical Maintenance Hints

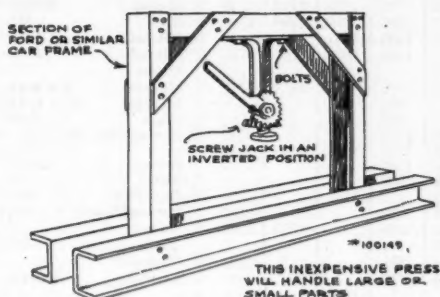
Tire or Tube Repairing in Garage or Small Shop

In the small shop selling gas, oils or accessories, or in the private garage, facilities for the repair of tube punctures or for plugging the small cuts in the tire casing by vulcanizing, are necessities. Practically all repairmen understand the method of using a small gasoline vulcanizer for these purposes. However the details of equipment which can be added to the bench, used for repairing these cuts, and shown in the attached sketch, simplify and expedite the work.

Two teaspoonsful of gasoline are the exact measure necessary for the vulcanizer. This is not a guess and a simpler measure could not be desired. Place a teaspoon and a can of gasoline with covering lid, such as a one pound grease can, at the rear edge of the bench where it is handy. Above the bench at the rear wall several trays made from varnish cans by cutting out one side and nailing against the wall, afford a place for the several materials and tools used, and assure that these can be found when wanted.

As a rest for the tube or wire, a piece of plank about six inches wide nailed to extend about a foot over the edge of the bench is needed. Making two holes in this for attaching hooks when placing the vulcanizer on a casing cut is far simpler than chaining the vulcanizer about the tire, and fixes the tire in such a position that it will not overturn and spill the flaming gasoline.

While locating a small hole in the tube it is not necessary to keep the hands submerged in water all the time. Take two wire hoops and twist them into



Simply made press for repairshop

forks as shown, and use them to hold the tube under water. Not any of these suggested contrivances will cost money, but they will make the work simpler.

Cooperation

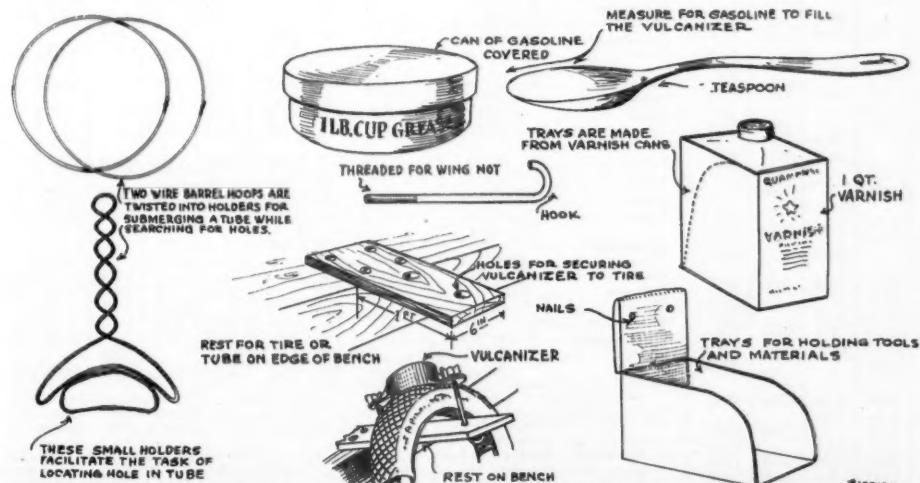
COOPERATION is the keynote of the automotive industry this year and will become more important as time goes on. Motor Age is pleased to extend an invitation to its readers, wherever they may be, to contribute short articles and sketches on easy or improved ways of doing hard things, which they may have worked out and thus lend their aid in **HELPING THE OTHER FELLOW**. Correspondence among contributors is also strongly urged. Let's get together and make this a happy family with one end in view, that of hearty, unselfish COOPERATION.

Simply Made Press for the Repairshop

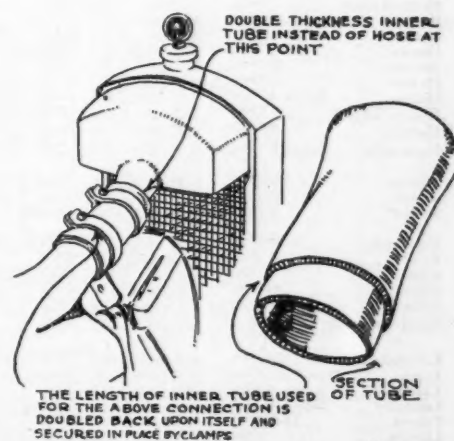
A local repairshop on automobile work which required the use of a press and was desirous of avoiding the cost of the manufactured article, rigged up a serviceable one from a screw jack and an old car frame in a simple and inexpensive manner. The frame was cut off and two cross members were riveted on as a stand. The jack was then secured by bolts in an inverted position, as shown in the accompanying drawing. The distance between the sides of the frame made the press suitable for handling automobile wheels and similar large parts, in addition to the usual small work of pressing in bushings and wrist pins. The construction and materials are inexpensive enough to warrant duplication of this rigging in any shop or by the private owner who does his own repair work.

A Durable Hose for Radiator Connection

One difficulty with the usual stiff fabric and rubber radiator hose connection used at the upper or outlet from the engine to the radiator is the invariable loosening of the hose at the clamp through vibration and the resultant loss of the water. In one of the mountainous regions of Virginia, practically every car is fitted with a hose connection which avoids this trouble. The connection consists of a piece of inner tube, twice the length of the required hose, doubled back upon itself and secured by the usual clamps. This flexible double thickness connection will stay in place regardless of how rough the roadway may be and is a sure cure for water leakage.



Equipment which can be added to the bench to expedite work in repairing tires and tubes



Durable hose for radiator connection

Specifications of Current Passenger Car Models

| NAME AND MODEL | Engine Make | Cylinders: Bore and Stroke | WB | Tires | 2-Pass. | 5-Pass. | 7-Pass. | Coupe | Sedan | NAME AND MODEL | Engine Make | Cylinders: Bore and Stroke | WB | Tires | 2-Pass. | 5-Pass. | 7-Pass. | Coupe | Sedan |
|----------------------------|-------------|----------------------------|---------|------------|---------|---------|---------|--------|--------|---------------------------|-----------------|----------------------------|---------|---------------|---------|---------|---------|--------|--------|
| Ace.....G | Guy | 6-3 1/2 x 5 | 123 | 32 x 4 | \$3975 | \$2975 | | \$3680 | \$3680 | Maibohm.....B | Falls | 6-3 1/2 x 4 1/2 | 116 | 32 x 4 | \$1575 | \$1575 | \$1750 | \$2395 | \$2395 |
| Ace.....H | H.S. | 6-3 1/2 x 5 | 123 | 32 x 4 | 2975 | 2975 | | 3680 | 3680 | Marmont.....34 | Ow. | 6-3 1/2 x 5 1/2 | 136 | 32 x 4 1/2 | 4185 | 3985 | 3385 | 4775 | 5775 |
| Ace.....L | H.S. | 4-3 1/2 x 5 | 116 | 32 x 4 | 2260 | 2260 | | | | Maxwell.....25 | Ow. | 4-3 1/2 x 4 1/2 | 100 | 30 x 3 1/2 | 845 | 845 | | 1445 | 1515 |
| Allen.....Series 43 | Ow. | 4-3 1/2 x 5 | 110 | 32 x 4 | 1385 | 1385 | | 2195 | | McFarlan.....1921 | Ow. | 6-4 1/2 x 6 | 140 | 33 x 5 | 6300 | 6300 | 6300 | 7500 | 7500 |
| Ambassador.....R | Cont. | 6-3 1/2 x 5 1/2 | 136 | 33 x 5 | | 4500 | 4500 | 6500 | | Mercer.....Series 5 | Ow. | 4-3 1/2 x 6 1/2 | 132 | 32 x 4 1/2 | 4500 | 4500 | 4500 | 5700 | 6200 |
| American.....C | H.S. | 6-3 1/2 x 5 | 127 | 32 x 4 | 2195 | 2275 | 2350 | 3150 | | Merit.....Cont. | Ow. | 6-3 1/2 x 4 1/2 | 119 | 32 x 4 | 2245 | 2245 | | | |
| Anderson.....Series 40 | Ow. | 6-3 1/2 x 5 1/2 | 120 | 33 x 4 | 2195 | 1795 | 1845 | 2795 | 2795 | Meteor.....R & RR | Dues. | 4-4 1/2 x 6 | 129 | 32 x 4 1/2 | 5500 | 5500 | | | |
| Apperson.....8-21-S | Ow. | 8-3 1/2 x 5 | 130 | 34 x 4 1/2 | | 3000 | 3250 | 4500 | 4500 | Metz.....M6 | Rut. | 6-3 1/2 x 5 | 120 | 32 x 4 | 1995 | 1995 | | 2795 | 2895 |
| Apperson.....Anniversary | Ow. | 8-3 1/2 x 5 | 130 | 34 x 4 1/2 | | 3500 | 3750 | | | Mitchell.....F-40 | Ow. | 6-3 1/2 x 5 | 120 | 33 x 4 | 1400 | 1400 | | 2590 | 2690 |
| Auburn.....6-39 | Cont. | 6-3 1/2 x 4 1/2 | 120 | 32 x 4 | | 1695 | 1695 | 2795 | 2795 | Mitchell.....F-42 | Ow. | 6-3 1/2 x 5 | 127 | 33 x 4 | | | 1795 | | |
| Beggs.....28T | Cont. | 6-3 1/2 x 4 1/2 | 120 | 33 x 4 | 1775 | 1775 | | 2675 | 2775 | Moller.....A | Ow. | 4-2 1/2 x 4 | 100 | 27 x 3 1/2 | 2000 | | | | |
| Bell.....4-32 | H.S. | 4-3 1/2 x 5 | 114 | 31 x 4 | | 1495 | | | | Monroe.....S-9 & 10 | Ow. | 4-3 1/2 x 4 1/2 | 115 | 32 x 3 1/2 | 1295 | 1295 | | | |
| Bell.....6-50 | H.S. | 6-3 1/2 x 5 | 124 | 32 x 4 | | 1695 | | | | Monroe.....S-11 & 12 | Ow. | 4-3 1/2 x 4 1/2 | 115 | 32 x 4 | | | 2015 | 2175 | |
| Biddle.....81 | Buda | 4-3 1/2 x 5 1/2 | 121 | 32 x 4 | 3475 | 3475 | | 3975 | | Moon.....6-48 | Cont. | 6-3 1/2 x 4 1/2 | 122 | 32 x 4 | 2085 | 1985 | 2485 | 2985 | |
| Birch Super Four | H.S. | 4-3 1/2 x 5 | 117 | 33 x 4 | 1345 | 1345 | 1395 | 2295 | 2295 | Murray-Mac Six | Ow. | 6-3 1/2 x 5 1/2 | 128 | 34 x 4 1/2 | 4250 | 4250 | | | |
| Birch Light Four | LeR. | 4-3 1/2 x 5 1/2 | 108 | 30 x 3 1/2 | | 1195 | | | | Nash.....681-7 | Ow. | 6-3 1/2 x 5 | 121 | 33 x 4 | 1525 | 1545 | 1695 | 2395 | 2695 |
| Birch Light Six | H.S. | 6-3 1/2 x 5 | 117 | 33 x 4 | 1595 | 1595 | | | | Nash.....682 | Ow. | 6-3 1/2 x 5 | 127 | 34 x 4 1/2 | | | 1695 | | |
| Bour-Davis.....21S | Cont. | 6-3 1/2 x 5 1/2 | 126 | 33 x 4 1/2 | 2385 | 2385 | | | | Nash Four.....41-4 | Ow. | 4-3 1/2 x 5 | 112 | 32 x 3 1/2 | 1175 | 1195 | | 1735 | 1935 |
| Brewster.....91 | Ow. | 4-4 x 5 1/2 | 125 | 32 x 4 1/2 | 7000 | 7000 | | 10500 | | National Sixlet.....BB | Ow. | 6-3 1/2 x 5 1/2 | 130 | 32 x 4 1/2 | 2990 | 2990 | 3990 | 3990 | |
| Briscoe.....4-34 | Ow. | 4-3 1/2 x 5 | 109 | 31 x 4 | 1085 | 1085 | | 1685 | 1685 | Nelson.....D | Ow. | 4-3 1/2 x 4 1/2 | 104 | 32 x 4 | | 1900 | | | |
| Brook.....S-21-A | Ow. | 2-3 1/2 x 3 1/2 | 90 | 28 x 3 | 395 | | | | | Noma.....1C | Cont. | 6-3 1/2 x 4 1/2 | 128 | 32 x 4 | 3000 | 3200 | | 4450 | |
| Buick.....1922-34-35-36-37 | Ow. | 4-3 1/2 x 5 1/2 | 109 | 31 x 4 | 935 | 975 | | 1475 | 1650 | Northway | Ow. | 6-3 1/2 x 5 1/2 | 128 | 33 x 5 | 4200 | 4200 | 6000 | 5600 | 5400 |
| Buick.....1922-41-5-6-7 | Ow. | 6-3 1/2 x 4 1/2 | 118 | 33 x 4 1/2 | 1495 | 1525 | | 2135 | 2435 | Norwalk.....430-KS | Lyc. | 4-3 1/2 x 5 | 116 | 32 x 3 1/2 | | 1035 | | | |
| Buick.....1922-48-9-50 | Ow. | 6-3 1/2 x 4 1/2 | 124 | 34 x 4 1/2 | | | 1735 | 2325 | 2635 | Oakland.....34-C | Ow. | 6-2 1/2 x 4 1/2 | 115 | 32 x 4 | 1095 | 1145 | | 1625 | 1725 |
| Bush.....E.C.4 | Lyc. | 4-3 1/2 x 5 | 116 | 33 x 4 | | 1195 | | | | Ogren.....6-60 | Ow. | 6-3 1/2 x 5 1/2 | 134 | 33 x 5 | 3850 | 3750 | 3900 | 5000 | 5100 |
| Bush.....E.C.6 | Rut. | 6-3 1/2 x 5 | 116 | 33 x 4 | | 1345 | | 1750 | 1850 | Oldsmobile.....43-A | Ow. | 4-3 1/2 x 5 1/2 | 115 | 32 x 4 | 1325 | 1345 | | 1895 | 2100 |
| Cadillac.....59 | Ow. | 8-3 1/2 x 5 1/2 | 125 | 34 x 4 1/2 | 3790 | 3790 | | 4950 | | Oldsmobile.....37A | Ow. | 6-2 1/2 x 4 1/2 | 112 | 32 x 4 | 1450 | 1450 | | 2145 | 2145 |
| Carroll.....C | Roth. | 6-3 1/2 x 5 | 128 | | 3985 | 3985 | | | | Oldsmobile.....46 | Ow. | 8-2 1/2 x 4 1/2 | 122 | 33 x 4 1/2 | | 1825 | 1875 | | 2775 |
| Carroll.....D | Roth. | 6-3 1/2 x 5 | 128 | | 3185 | 3185 | | | | Oldsmobile.....47 | Ow. | 8-2 1/2 x 4 1/2 | 115 | 32 x 4 | | 1725 | | 2225 | 2425 |
| Case.....V | Cont. | 6-3 1/2 x 5 1/2 | 126 | 34 x 4 1/2 | 2250 | 2250 | 2900 | 3285 | | Overland.....4 | Ow. | 4-3 1/2 x 4 | 100 | 30 x 3 1/2 | 695 | 695 | | 1000 | 1275 |
| Chalmers.....6-30 | Ow. | 6-3 1/2 x 4 1/2 | 117 | 32 x 4 | 1495 | 1545 | | 2295 | 2445 | Packard.....Single-Six | Ow. | 6-3 1/2 x 4 1/2 | 116 | 33 x 4 1/2 | 2975 | 2975 | | 3750 | 3975 |
| Chalmers.....6-30 | Ow. | 6-3 1/2 x 4 1/2 | 122 | 32 x 4 1/2 | | | 1795 | | | Packard.....Twin Six | Ow. | 12-3 x 5 | 136 | 35 x 5 | 4850 | 4850 | 4850 | 6600 | 6300 |
| Champion.....Tourist | Lyc. | 4-3 1/2 x 5 | 113 | 32 x 3 1/2 | | 1095 | | | | Paige.....6-42 | Ow. | 6-3 1/2 x 5 | 119 | 32 x 4 | 1635 | 1635 | | 2450 | 2570 |
| Champion.....Special | H.S. | 4-3 1/2 x 5 | 118 | 32 x 4 | 1395 | 1395 | | | | Paige.....6-66 | Cont. | 6-3 1/2 x 5 | 131 | 33 x 4 1/2 | 3295 | 2875 | | 3755 | 3830 |
| Chandler.....Six | Ow. | 6-3 1/2 x 5 | 123 | 33 x 4 | 1785 | 1785 | 2785 | 2885 | | Pan.....A | Ow. | 4-3 1/2 x 5 | 108 | 33 x 4 | | 1500 | | | |
| Chevrolet.....490 | Ow. | 4-3 1/2 x 4 | 102 | 30 x 3 1/2 | 625 | 625 | | 975 | 975 | Pan American E & F-55 | H.S. | 6-3 1/2 x 5 | 121 | 33 x 4 | 2000 | 2000 | 2100 | | |
| Chevrolet.....FB | Ow. | 4-3 1/2 x 5 1/2 | 110 | 33 x 4 | 975 | 975 | | 1575 | 1575 | Parenti.....1921 | Ow. | 8-2 1/2 x 4 1/2 | 125 | 32 x 4 | | 2000 | | | 3000 |
| Cleveland.....40 | Ow. | 6-3 x 4 1/2 | 112 | 32 x 4 | 1295 | 1295 | | 2195 | 2295 | Peterson.....650 | Cont. | 6-3 1/2 x 4 1/2 | 120 | 33 x 4 | | 1595 | 1625 | 2895 | 2955 |
| Climber Four | H.S. | 4-3 1/2 x 5 | 117 | | 1450 | 1385 | | | | Peterson.....56-S-7 | Ow. | 8-3 1/2 x 5 | 125 | 34 x 4 1/2 | | 2990 | 2990 | 3680 | 3950 |
| Climber Six | H.S. | 6-3 1/2 x 5 | 125 1/2 | 32 x 4 1/2 | 2250 | 2250 | | | | Peters.....Ow. | 2-3 1/2 x 3 1/2 | 90 | 28 x 3 | 385 | | | | | |
| Cole.....870 | Nort. | 8-3 1/2 x 4 1/2 | 127 | 33 x 5 | 2550 | 2605 | 2795 | 3095 | 3995 | Piedmont.....4-30 | Lyc. | 4-3 1/2 x 5 | 116 | 32 x 3 1/2 | | 1270 | | | |
| Columbia Challenger | Rut. | 6-3 1/2 x 5 | 115 | 32 x 4 | 1495 | | | | | Piedmont.....6-40 | Ow. | 6-3 1/2 x 4 1/2 | 122 | 32 x 4 | | 1495 | | | |
| Columbia.....D-C & CS | Cont. | 6-3 1/2 x 4 1/2 | 115 | 32 x 4 | 1795 | 1795 | | 2495 | 2595 | Pierce-Arrow | Ow. | 6-4 x 5 1/2 | 133 | 33 x 5 | 8000 | 7500 | 7500 | 8500 | 9000 |
| Comet.....C-53 | Cont. | 6-3 1/2 x 5 1/2 | 125 | 33 x 4 1/2 | | 2350 | 2450 | 3650 | | Pilot.....6-45 | Teetor | 6-3 1/2 x 5 | 120 | 32 x 4 | 1945 | 1895 | | | |
| Commonwealth.....44 | H.S. | 4-3 1/2 x 5 | 117 | 32 x 4 | | 1395 | | 2465 | | Pilot.....6-50 | H.S. | 6-3 1/2 x 5 | 126 | 32 x 4 1/2 | 2285 | 2285 | 2335 | 3350 | 3400 |
| Crawford.....21-40 | Cont. | 6-3 1/2 x 5 1/2 | 122 1/2 | 32 x 4 | 3000 | 3000 | | 4500 | | Porter.....40 | Ow. | 4-4 1/2 x 5 1/2 | 142 | 35 x 5 | 6750 | | | | |
| Crow-Elkhart.....163-65 | Lyc. | 4-3 1/2 x 5 | 117 | 32 x 3 1/2 | 1295 | 1295 | | | | Premier.....6-D | Ow. | 6-3 1/2 x 5 1/2 | 127 | 33 x 5 | 3790 | 3690 | 3890 | 4690 | 5190 |
| Crow-Elkhart.....S63-65 | H.S. | 6-3 1/2 x 5 | 117 | 33 x 4 | 1545 | 1545 | | | 2395 | Premocor.....6-40-A | Falls | 6-3 1/2 x 4 1/2 | 117 | 33 x 4 | 1295 | 1295 | | | |
| Daniels.....D-19 | Ow. | 8-3 1/2 x 5 1/2 | 132 | 34 x 4 1/2 | 5350 | 5350 | 6250 | 6050 | | Raleigh.....A-60 | H.S. | 6-3 1/2 x 5 | 122 | 32 x 4 1/2 | 2250 | 2250 | | 3100 | 3200 |
| Davis.....61-67 | Cont. | 6-3 1/2 x 4 1/2 | 120 | 33 x 4 | 1995 | 1995 | 2795 | 2795 | | R & V Knight.....R | Ow. | 4-3 1/2 x 5 | 116 | 32 x 4 | | 2150 | | 2850 | 2950 |
| Dispatch.....H-S-70 | Wisc. | 4-3 1/2 x 5 | 120 | 34 x 4 | 1250 | 1350 | 1525 | 1575 | | R & V Knight.....J | Ow. | 6-3 1/2 x 4 1/2 | 127 | 32 x 4 1/2 | 3350 | 3350 | 3350 | 4000 | 4200 |
| Dixie Flyer.....H-S-70 | Ow. | 4-3 1/2 x 5 | 112 | 32 x 4 | 1445 | 1445 | | 2295 | 2345 | Reo.....T-6 | Ow. | 6-3 1/2 x 5 | 120 | 33 x 4 | 1650 | 1650 | | 2700 | 2750 |
| Dodge Brothers.....6-80 | Ow. | 4-3 1/2 x 4 1/2 | 114 | 32 x 4 | 935 | 985 | | 1585 | | Rever.....C | Dues. | 4-4 1/2 x 6 | 131 | 32 x 4 1/2 | 4650 | 4650 | 4650 | 5500 | 6500 |
| Dorris.....17-12 | D-Ly | 4-3 1/2 x 5 | 108 | 31 x 4 | 935 | | 4785 | 5800 | 6090 | Roamer.....6-54-E | Cont. | 6-3 1/2 x 5 1/2 | 128 | 32 x 4 1/2 | 3150 | 3150 | 3250 | 3985 | 4100 |
| Dort.....17-12 | D-Ly | 4-3 1/2 x 5 | 108 | 31 x 4 | 935 | | 4785 | 5800 | 6090 | Roamer.....4-75-E | Dues. | 4-4 1/2 x 6 | 128 | 32 x 4 1/2 | 4150 | 3995 | | | |
| Dupont.....A | Ow. | 4-3 1/2 x 5 1/2 | 124 | 32 x 4 1/2 | 3400 | 3400 | | 4900 | | Rolls-Royce.....Ow. | 6-4 1/2 x 4 1/2 | 143 1/2 | 33 x 5 | U. S. Chassis | | 11750 | | | |
| Elcar.....K-4 | Lyc. | 4-3 1/2 x 5 | 117 | 33 x 4 | 1195 | 1195 | | | | Romer.....Cont. | 6-3 1/2 x 4 1/2 | 120 | 33 x 4 | 2000 | 2000 | 2100 | 2450 | 2750 | |
| Elcar.....7-R | Falls | 6-3 1/2 x 4 1/2 | 118 | 33 x 4 | 1595 | 1495 | 1595 | 2395 | 2495 | Saxon.....125 | Ow. | 4-3 1/2 x 5 | 112 | 32 x 4 | 1545 | 1495 | | 2295 | 2295 |
| Elgin.....K-1 | Ow. | 6-3 1/2 x 4 1/2 | 118 | 33 x 4 | 1595 | 1495 | 1595 | 2395 | 2495 | Sayers Six.....DP | Cont. | 6-3 1/2 x 4 1/2 | 118 | 33 x 4 | 2495 | 2195 | | 3295 | |
| Essex.....S-5-21 | Ow. | 6-3 1/2 x 5 | 108 1/2 | 32 x 4 | 1445 | 1445 | | 1950 | 2300 | Scrapps-Booth.....B-39-42 | Nort. | 6-2 1/2 x 4 1/2 | 115 | 32 x 4 | 1275 | 1295 | | 1950 | 2100 |
| Fergus.....S-5-21 | Ow. | 6-3 1/2 x 5 | 126 | 32 x 4 1/2 | | | Chassi | 8500 | | Scrapps-Booth.....F-43-46 | Cont. | 6-3 1/2 x 4 1/2 | 115 | 32 x 4 | 1470 | 1490 | | 2350 | 2375 |
| Ferris.....T | Cont. | 6-3 1/2 x 5 1/2 | 130 | 32 x 4 1/2 | 3350 | | 2595 | 3675 | | Seneca.....L & O | LeR. | 4-3 1/2 x 4 1/2 | 108 | 30 x 3 1/2 | 1045 | 1045 | | | |
| Ford.....T | Ow. | 4-3 1/2 x 4 | 110 | 30 x 3 1/2 | 370 | 1145 | | 635 | 760 | Severin.....Six | Cont. | 6-3 1/2 x 5 1/2 | 122 1/2 | 33 x 4 1/2 | 1485 | 1485 | | 2100 | 2250 |
| Franklin.....9-B | Ow. | 6-3 1/2 x 4 | 115 | 32 x 4 | 2550 | 2650 | 2650 | 3650 | | Severin.....Six | Cont. | 6-3 1/2 x 5 1/2 | 122 1/2 | 33 x 5 | 2550 | 2550 | 2550 | 3250 | 3370 |
| Friend.....Four | Ow. | 4-3 1/2 x 4 1/2 | 112 | 32 x 3 1/2 | 1285 | 1285 | | 1985 | 2035 | Sheridan.....4 | Nort. | 4-3 1/2 x 5 1/2 | 116 | 33 x 4 | 1485 | 1485 | | 2060 | 2300 |
| Gardner.....G | Lyc.</ | | | | | | | | | | | | | | | | | | |

Specifications of Current Motor Truck Models

| NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive |
|-------------------|---------------|---------------|-----------------|----------|----------|-------------|-----------------|---------------|---------------|-----------------|----------|----------|-------------|-----------------|---------------|---------------|-----------------|----------|-----------|-------------|
| | | | | Front | Rear | | | | | | Front | Rear | | | | | | Front | Rear | |
| Acason | 3/4 | \$1650 | 3 1/2 x 5 | 34x5 1/2 | 34x5 1/2 | W | Concord, BX | 2 1/2 | \$3600 | 4 1/2 x 5 1/2 | 36x4 | 36x8 | W | Gary, I | 1 1/2 | \$2550 | 4 x 5 1/2 | 36x3 1/2 | 36x5 | W |
| Acason, R | 1 | 2260 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Cook, 41 | 2 | 3000 | 4 1/2 x 5 1/2 | 36x6 1/2 | 38x7 1/2 | I | Gary, J | 2 1/2 | 3150 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W |
| Acason, RB | 1 1/2 | 2485 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x6 | W | Corbitt, E | 1 | 2200 | 3 1/2 x 5 | 34x3 1/2 | 34x4 | W | Gary, K | 3 1/2 | 4050 | 4 1/2 x 6 | 36x5 | 40x5d | W |
| Acason, H | 2 1/2 | 3295 | 4 1/2 x 5 1/2 | 36x4 | 36x4d | W | Corbitt, D | 1 1/2 | 2600 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W | Gary, M | 5 | 5150 | 5 x 6 1/2 | 36x6 | 40x6d | W |
| Acason, L | 3 1/2 | 4295 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Corbitt, C | 2 | 3150 | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x7 | W | Gersix M | 1 1/2 | 3100 | 4 x 5 1/2 | 36x3 1/2 | 36x7 | W |
| Acason, M | 5 | 5250 | 5 x 6 1/2 | 36x6 | 40x12 | W | Corbitt, B | 2 1/2 | 3300 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Gersix K | 2 1/2 | 3500 | 4 1/2 x 5 1/2 | 36x4 | 36x8 | W |
| Ace, C | 1 1/2 | 2295 | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x5 | W | Corbitt, A | 3 1/2 | 4100 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | Gersix | 3 1/2 | 4500 | 4 1/2 x 6 | 36x5 | 40x12 | W |
| Ace, A | 2 1/2 | 2795 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Corbitt, AA | 5 | 5000 | 4 1/2 x 6 | 36x6 | 40x6d | W | Giant, 15-A | 1 1/2 | 2250 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W |
| Acme, G | 3/4 | ..... | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | W | Cyclone A | 1 1/2 | 2635 1/2 | 3 1/2 x 5 | 34x5 1/2 | 36x6 1/2 | I | Giant, 16 | 2 | 3050 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W |
| Acme, B | 1 | ..... | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Dart, S | 1 1/2 | ..... | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x6 | W | Giant, 17 | 3 1/2 | 4150 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W |
| Acme, F | 1 1/2 | ..... | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Dart, M | 2 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Globe D-20 | 3 1/2 | 1495 | 3 1/2 x 5 | 33x4 1/2 | 33x4 1/2 | B |
| Acme, A | 2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 36x7 | W | Dart, W | 2 1/2 | ..... | 4 1/2 x 6 | 36x5 | 36x10 | W | Globe | 1 | 1495 | 3 1/2 x 5 | 33x5 | 33x5 | B |
| Acme, C | 3 1/2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 40x10 | W | Day-Elder, A | 1 | 2225 | 3 1/2 x 5 | 34x3 1/2 | 34x4 | W | Golden West, GH | 3 | 5000 | 4 1/2 x 6 | 36x7 | 36x7 | W |
| Acme, E | 5 | ..... | 4 1/2 x 6 | 36x6 | 40x12 | W | Day-Elder, B | 1 1/2 | 2300 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Golden West, G | 3 1/2 | 4500 | 4 1/2 x 5 1/2 | 36x6 | 36x6 | W |
| Akr Multi-Trk 20 | 1 | 1995 | 4 x 5 1/2 | 34x5 | 34x5 | B | Day-Elder, D | 2 | 2900 | 4 1/2 x 5 | 36x4 | 36x7 | W | Golden West, H | 3 1/2-4 | 5000 | 4 1/2 x 6 | 36x6 | 36x6 | W |
| All-Power, C | 3 1/2 | 1580 | 4 1/2 x 6 | 36x7 | 36x10 | W | Day-Elder, C | 2 1/2 | 2750 | 4 1/2 x 5 | 36x4 | 36x7 | W | Golden West, T | 4 | 5500 | 4 1/2 x 6 | 36x6 | 36x6 | W |
| All-American, B-1 | 1 | 1795 | 3 1/2 x 5 | 32x4 | 32x4 | I | Day-Elder, F | 3 1/2 | 3700 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Golden West, K | 7 | 6000 | 5 1/2 x 6 | 36x6 | 36x6 | W |
| All-American C-1 | 1 1/2 | 2195 | 3 1/2 x 5 | 34x4 | 34x5 | I | Day-Elder, E | 5 | 4875 | 4 1/2 x 6 | 36x5 | 36x6d | W | Golden West, HA | 7 | 6000 | 4 1/2 x 6 | 36x6 | 36x10 | W |
| American, 25 | 2 1/2 | 3350 | 4 x 6 | 36x4 | 36x4d | W | Dearborn, F | 1 1/2 | 2180 | 3 1/2 x 5 1/2 | 34x4 | 34x5 | W | Gove, A-1 | 2 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 | 36x7 | I |
| American, 40 | 4 | 4275 | 4 1/2 x 6 | 36x5 | 36x5d | W | Dearborn, 48 | 2 | 2590 | 3 1/2 x 5 1/2 | 35x5 1/2 | 34x7 1/2 | W | Graham Bros. A | 1 1/2 | 2495 | 3 1/2 x 5 | 35x5 1/2 | 36x6 1/2 | I |
| Apex, G | 1 | 1675 | 3 1/2 x 5 | 33x5 1/2 | 33x5 1/2 | I | Defiance, G | 1 | 1975 | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | I | Gramm-Bern., 10 | 1 | 1495 1/2 | 3 1/2 x 5 | 33x5 1/2 | 35x5 1/2 | I |
| Apex, D | 1 1/2 | 1915 | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x4 | I | Defiance, D | 1 1/2 | 2550 | 3 1/2 x 5 | 35x5 1/2 | 36x6 1/2 | I | Gramm-Bern., 15 | 1 1/2 | 2050 1/2 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | I |
| Apex, E | 2 1/2 | 2695 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | I | Defiance, E | 2 | 2750 | 3 1/2 x 5 | 35x5 1/2 | 38x7 1/2 | I | Gramm-Bern., 65 | 1 1/2 | 2725 1/2 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W |
| Apex, F | 3 1/2 | 3975 | 4 1/2 x 6 | 36x5 | 36x10 | I | DeKalb, E2 1/2 | 2 | 2600 | 4 1/2 x 5 1/2 | 36x4 | 36x6 | W | Gramm-Bern., 20 | 2 | 3175 1/2 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W |
| Armleder, 20 | 2 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | DeKalb, E2 | 2 1/2 | 2250 | 4 1/2 x 5 1/2 | 34x3 1/2 | 36x5 | W | Gramm-Bern., 25 | 2 1/2 | 3575 1/2 | 4 1/2 x 5 1/2 | 36x4 | 36x4d | W |
| Armleder, HW | 2 1/2 | ..... | 4 1/2 x 6 | 36x5 | 36x5d | W | DeMartini 1 1/2 | 1 1/2 | 2600 | 3 1/2 x 5 | 34x3 1/2 | 34x6 | W | Gramm-Bern., 35 | 3 1/2 | 4375 1/2 | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W |
| Armleder, KW | 2 1/2 | ..... | 4 1/2 x 6 | 36x5 | 36x5d | W | DeMartini 2 | 2 | 3300 | 4 x 5 1/2 | 36x3 1/2 | 36x7 | W | Gramm-Bern., 50 | 5 | 5275 1/2 | 4 1/2 x 6 | 36x6 | 40x6d | W |
| Atco, B | 1 1/2 | ..... | 3 1/2 x 5 1/2 | 34x5 1/2 | 36x6 | I | DeMartini 3 | 3 | 4250 | 4 1/2 x 5 1/2 | 36x4 | 36x10 | W | Hahn, JH | 1 | ..... | 3 1/2 x 5 | 34x5 | 34x5 | W |
| Atco, BI | 1 1/2 | ..... | 3 1/2 x 5 1/2 | 34x5 1/2 | 36x6 1/2 | I | DeMartini 4 | 4 | 4800 | 4 1/2 x 6 | 36x5 | 36x12 | W | Hahn, CD | 1 1/2 | ..... | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x6 | W |
| Atco, A | 1 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 1/2 | 36x8 | W | Denby, 12 | 1 | 1625 | 3 1/2 x 5 | 35x5 | 36x6 | I | Hahn, EE | 2 1/2 | ..... | 4 1/2 x 5 1/2 | 36x4 | 36x8 | W |
| Atlas, M.D | 2 | ..... | 3 1/2 x 5 | 32x4 1/2 | 32x4 1/2 | I | Denby, 33 | 1 1/2 | 2300 | 3 1/2 x 5 | 35x5 1/2 | 38x7 1/2 | I | Hahn, F | 3 1/2 | ..... | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W |
| Atterbury, 20R | 1 1/2 | 2775 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Denby, 134 | 2 | 2600 | 3 1/2 x 5 | 36x3 1/2 | 36x6 | I | Hahn, EF | 5 | ..... | 4 1/2 x 6 | 36x6 | 40x12 | W |
| Atterbury, 7CX | 2 1/2 | 3375 | 4 1/2 x 5 1/2 | 36x4 | 36x4d | W | Denby, 25 | 3 | 3300 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | I | Hal Fur, E | 1 | 2250 | 4 x 5 | 35x5 1/2 | 35x5 1/2 | W |
| Atterbury, 7D | 3 1/2 | 4175 | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W | Denby, 27 | 4 | 4200 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | I | Hal Fur, B | 2 1/2 | 3250 | 4 1/2 x 5 1/2 | 35x5 | 38x7 | W |
| Atterbury, 8E | 5 | 5575 | 4 1/2 x 6 | 36x5 | 40x6d | W | Denby, 210 | 5 | 4850 | 4 1/2 x 5 1/2 | 36x6 | 40x6d | I | Hal Fur, F | 3 1/2 | 4250 | 4 1/2 x 5 1/2 | 36x6 1/2 | 40x10 1/2 | W |
| Autocar, 21UF | 1 1/2-2 | 2300 | 4 1/2 x 5 1/2 | 34x4 | 34x5 | D | Dependable, A | 3 1/2-1 | 1650 | 3 1/2 x 5 | 34x5 | 36x6 | W | Hall | 1 1/2 | 3100 | 3 1/2 x 5 | 34x5 1/2 | 38x7 1/2 | W |
| Autocar, 21UG | 1 1/2-2 | 2400 | 4 1/2 x 5 1/2 | 34x4 | 34x5 | D | Dependable, C | 1 1/2 | 2350 | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x5 | W | Hall | 2 1/2 | 3275 | 4 1/2 x 5 1/2 | 36x4 | 36x6 | W |
| Autocar, 26V | ..... | 4350 | 4 1/2 x 5 1/2 | 34x5 | 36x10 | D | Dependable, D | 2 | 2650 | 4 x 5 1/2 | 34x5 | 36x6 | W | Hall | 3 1/2 | 4100 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W |
| Autocar, 26-B | ..... | 4500 | 4 1/2 x 5 1/2 | 34x5 | 36x10 | D | Dependable, E | 2 1/2 | 2950 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Hall | 5 | 5100 | 4 1/2 x 5 1/2 | 36x5 | 40x6d | W |
| Available, H1 1/2 | 1 1/2 | 2750 | 4 x 5 1/2 | 36x3 1/2 | 36x5 | W | Dependable, G | 3 1/2 | 3550 | 4 1/2 x 6 | 36x6 | 38x7 | W | Hall | 7 | 5100 | 4 1/2 x 5 1/2 | 36x5 | 40x6d | C |
| Available, H2 1/2 | 2 1/2 | 3475 | 4 x 5 1/2 | 36x3 1/2 | 36x8 | W | Diamond-T, O | 1 | 2500 | 3 1/2 x 5 1/2 | 34x5 1/2 | 36x6 1/2 | W | Harvey, WEA | 1 1/2 | 2550 | 4 1/2 x 5 1/2 | 34x3 1/2 | 34x5 | W |
| Available, H3 1/2 | 3 1/2 | 4475 | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W | Diamond-T, FS | 1 1/2 | 2960 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Harvey, WFA | 2 1/2 | 3300 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W |
| Available, H5 | 5 | 5375 | 4 1/2 x 6 | 36x6 | 40x12 | W | Diamond-T, T | 1 1/2 | 2650 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Harvey, WHA | 3 1/2 | 4300 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W |
| Available, H7 | 7 | 6000 | 5 x 6 | 36x6 | 40x14 | B | Diamond-T, U | 2 | 3285 | 4 x 5 1/2 | 36x4 | 36x7 | W | Harvey, WKA | 5 | 5200 | 4 1/2 x 6 | 36x6 | 40x6d | W |
| Avery | 1 | ..... | 3 x 4 | 34x5 1/2 | 34x5 1/2 | I | Diamond-T, K | 3 1/2 | 4675 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Hawkeye, K | 1 1/2 | 1850 | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x5 | I |
| Beck, A. Jr. | 1 | 1800 | 3 1/2 x 5 | 34x3 1/2 | 34x4 | I | Diamond-T, EL | 5 | 5400 | 4 1/2 x 5 1/2 | 36x6 | 40x6d | W | Hawkeye, M | 2 | 2650 | 4 1/2 x 5 1/2 | 36x4 | 36x6 | I |
| Beck, C | 2 | 2550 | 4 1/2 x 5 1/2 | 36x4 | 36x6 | I | Diamond-T, S | 5 | 5650 | 4 1/2 x 6 | 36x6 | 40x6d | W | Hawkeye, N | 3 1/2 | | | | | |

Specifications of Current Motor Truck Models—Continued

| NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive |
|-------------------|---------------|---------------|-----------------|----------|----------|-------------|-------------------|---------------|---------------|-----------------|----------|----------|-------------|------------------|---------------|---------------|-----------------|----------|----------|-------------|
| | | | | Front | Rear | | | | | | Front | Rear | | | | | | Front | Rear | |
| Kelly-S, K-45 | 4 | \$4550 | 4 1/2 x 6 1/2 | 36x5 | 40x6d | C | Ogden, A1 | 1 1/2 | \$2550 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W | Service, 71 | 3 1/2 | \$4285 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W |
| Kelly-S, K-50 | 5 | 4900 | 4 1/2 x 6 1/2 | 36x6 | 40x6d | C | Ogden, E | 2 1/2 | 3250 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Service, 76 | 3 1/2 | 4485 | 4 1/2 x 6 | 36x5 | 36x5d | W |
| Kelly-S, K-60 | 6 | 5100 | 4 1/2 x 6 1/2 | 36x6 | 40x7d | C | Old Hickory, W | 1 | 2175 | 3 1/2 x 5 | 36x3 1/2 | 36x4* | W | Service, 101 | 5 | 5275 | 4 1/2 x 6 | 36x6 | 40x6d | W |
| Keystone, 40 | 2 | 2450 | 3 1/2 x 5 1/2 | 34x5 1/2 | 38x7 1/2 | I | Old Reliable, A | 1 1/2 | 2340 | 4 x 5 | 34x4 | 36x6 | W | Signal, NF | 1 | 2475 | 4 1/2 x 5 1/2 | 34x5 1/2 | 36x6 1/2 | W |
| Kimball, AB | 2 | 3675 | 4 x 6 | 36x4 | 36x7 | W | Old Reliable, B | 2 1/2 | 3500 | 4 x 5 1/2 | 34x4 | 36x4d | W | Signal, H | 1 1/2 | 2925 | 4 1/2 x 5 1/2 | 34x4 | 36x6 | W |
| Kimball, AC | 2 1/2 | 3975 | 4 1/2 x 6 | 36x4 | 36x8 | W | Old Reliable, C | 3 1/2 | 4250 | 4 1/2 x 6 | 36x5 | 36x5d | W | Signal, J | 2 1/2 | 3275 | 4 1/2 x 5 1/2 | 34x4 | 36x8 | W |
| Kimball, AK | 3 | 4500 | 4 1/2 x 6 | 36x4 | 36x10 | W | Old Reliable, D | 5 | 5250 | 4 1/2 x 6 | 36x6 | 40x6d | W | Signal, M | 3 1/2 | 4275 | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W |
| Kimball, AE | 4 | 5000 | 4 1/2 x 6 | 36x5 | 40x12 | W | Old Reliable, KLM | 7 | 6000 | 4 1/2 x 6 1/2 | 36x6 | 40x7d | C | Signal, R | 5 | 5300 | 4 1/2 x 6 | 36x6 | 40x6d | W |
| Kimball, AF | 5 | 5975 | 5 x 6 | 36x6 | 40x7d | W | Oldsmobile Econ. | 1 | 1250 | 3 1/2 x 5 1/2 | 35x5 1/2 | 35x5 1/2 | I | Southern, 10 | 1 | 290 | 3 1/2 x 5 | 34x3 1/2 | 34x4 | W |
| Kissel, Express | 1 | 1985 1/2 | 3 1/2 x 5 1/2 | 34x5 1/2 | 34x5 1/2 | W | Olympic, A | 1 1/2 | 3500 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Southern, 15 | 1 1/2 | 2590 | 3 1/2 x 5 1/2 | 36x6 1/2 | 34x4 | W |
| Kissel, Utility | 1 1/2 | 2775 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Oneida, A-9 | 2 1/2 | 2350 | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Southern, 20 | 2 | 2990 | 4 1/2 x 5 1/2 | 36x6 1/2 | 40x8* | W |
| Kissel, Freight | 2 1/2 | 3475 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Oneida, B-9 | 2 1/2 | 2915 | 4 x 5 1/2 | 36x4 | 36x7 | W | Standard, 1-K | 1-1 1/2 | 1950 | 3 1/2 x 5 | 34x3 1/2 | 34x5* | W |
| Kissel, H. D. | 4 | 4475 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Oneida, C-9 | 3 1/2 | 3390 | 4 x 5 1/2 | 36x4 | 36x7 | W | Standard, 76 | 2 1/2-3 | 3100 | 4 1/2 x 5 1/2 | 36x4 | 36x7* | W |
| Kleiber, AA | 1 | 2600 | 4 1/2 x 5 1/2 | 34x3 1/2 | 34x5* | W | Oneida, D-9 | 3 1/2 | 4345 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | Standard, 66 | 3 1/2-4 | 4000 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W |
| Kleiber, AB | 1 1/2 | 3100 | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x6* | W | Oneida, E-9 | 5 | 5460 | 4 1/2 x 5 1/2 | 36x6 | 40x12 | W | Standard, 5-K | 5-6 | 5250 | 4 1/2 x 6 | 36x6 | 40x12 | W |
| Kleiber, BB | 2 | 3600 | 4 1/2 x 5 1/2 | 36x4* | 36x7* | W | Orleans, A | 1 1/2 | 2750 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Sterling, 1 1/2 | 1 1/2 | 3200 | 4 x 5 1/2 | 36x3 1/2 | 36x5* | W |
| Kleiber, B | 2 1/2 | 4200 | 4 1/2 x 5 1/2 | 36x5* | 36x8 | W | Orleans, B | 2 1/2 | 3250 | 4 1/2 x 5 1/2 | 36x4* | 36x7* | W | Sterling, 2 | 2 | 3500 | 4 x 5 1/2 | 36x4 | 36x5* | W |
| Kleiber, C | 3 1/2 | 4900 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Orleans, C | 3 1/2 | 3750 | 4 1/2 x 5 1/2 | 36x4 1/2 | 36x8 | W | Sterling, 2 1/2 | 2 1/2 | 3650 | 4 1/2 x 5 1/2 | 36x4* | 36x4* | W |
| Kleiber, D | 5 | 5600 | 5 x 6 1/2 | 36x6 | 40x12 | W | Orleans, D | 5 | 4250 | 4 1/2 x 5 1/2 | 36x6 | 40x8 | W | Sterling, 3 1/2 | 3 1/2 | 4650 | 4 1/2 x 5 1/2 | 36x5* | 40x5d* | W |
| Koehler, D | 1 1/2 | ... | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Oshkosh, A | 2 | 3750 | 3 1/2 x 5 | 36x6 1/2 | 36x6 1/2 | 4 | Sterling, 5-W | 5 | 5500 | 5 x 6 1/2 | 36x6 | 40x6d | C |
| Koehler, M | 2 1/2 | ... | 4 x 5 1/2 | 36x4 | 36x7 | W | Oshkosh, AA | 2 | 3850 | 3 1/2 x 5 | 36x6 1/2 | 36x6 1/2 | 4 | Sterling, 5-C | 5 | 6000 | 5 x 6 1/2 | 36x6 | 40x6d | C |
| Koehler, MCS | 2 1/2 | ... | 4 x 5 1/2 | 36x4 | 36x7 | W | Oshkosh, B | 2 1/2 | 4150 | 4 x 5 1/2 | 38x7 1/2 | 38x7 1/2 | 4 | Sterling, 7 1/2 | 7 1/2 | 6590 | 5 x 6 1/2 | 36x6 | 40x7d | C |
| Koehler, F | 3 1/2 | ... | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | Oshkosh, BB | 2 1/2 | 4300 | 4 x 5 1/2 | 38x7 1/2 | 38x7 1/2 | 4 | Stewart, 11 | 11 | 1350 | 3 1/2 x 4 1/2 | 32x4 1/2 | 32x4 1/2 | I |
| Koehler, MT, Trac | 5 | ... | 4 x 5 1/2 | 36x4 | 36x7 | W | Packard, EC | ... | 3500 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Stewart, 15 | 1 | 1875 | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | I |
| L.M.C., 2-20 | 2 1/2 | 2540 | 4 1/2 x 5 1/2 | 36x4 | 36x4d | I | Packard, ED | ... | 4100 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Stewart, 9 | 1 1/2 | 2200 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | I |
| Lange, B | 1 1/2 | 3350 | 4 1/2 x 5 1/2 | 36x4* | 36x6* | C | Packard, EF | ... | 4500 | 5 x 5 1/2 | 36x6 1/2 | 40x6 1/2 | I | Stewart, 7 | 2 | 2900 | 4 1/2 x 5 1/2 | 34x4 | 34x7 | I |
| Larrabee, U | 1 1/2 | 2400 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | W | Packard, EX | ... | 4000 | 4 1/2 x 5 1/2 | 36x6 1/2 | 40x6 1/2 | I | Stewart, 7-X | 2 1/2 | 2950 | 4 1/2 x 5 1/2 | 34x4 | 34x7 | I |
| Larrabee, SK | 2 1/2 | 3200 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Paige, 52-19 | 1 1/2 | 2880 | 4 x 5 1/2 | 34x3 1/2 | 34x6 | W | Stewart, 10 | 3 1/2 | 3850 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | I |
| Larrabee, FL | 3 1/2 | 4000 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Paige, 54-20 | 2 1/2 | 3400 | 4 1/2 x 5 1/2 | 34x4 | 34x4d | W | Stewart, 10-X | 3 1/2 | 3850 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | I |
| Larrabee, FW | 5 | 4900 | 4 1/2 x 6 | 36x6 | 40x6d | W | Paige, 51-18 | 3 1/2 | 4285 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Stoughton, A | 1 | 1995 | 3 1/2 x 5 1/2 | 34x4 1/2 | 35x5 1/2 | W |
| Lion, L | 1 | 2350 | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | W | Parker, F20 | 2 | 3500 | 4 x 6 | 34x4 | 36x4d | W | Stoughton, B | 1 1/2 | 2350 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W |
| Luedinghaus, C | 1 | 2100 | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | W | Parker, J20 | 3 1/2 | 4400 | 4 1/2 x 6 | 36x5 | 40x5d | W | Stoughton, D | 2 | 2800 | 4 x 5 1/2 | 36x4 | 36x7 | W |
| Luedinghaus, W | 1 1/2 | 2700 | 3 1/2 x 5 1/2 | 34x3 1/2 | 34x5* | W | Parker, M20 | 5 | 5500 | 4 1/2 x 6 | 36x6 | 40x6d | W | Stoughton F | 3 | 3600 | 4 1/2 x 5 1/2 | 36x5d | 36x5d | W |
| Luedinghaus, W | 1 1/2 | 3150 | 4 1/2 x 5 1/2 | 36x4 | 36x7* | W | Patriot, Revere | 5 | 1755 | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | I | Sullivan, E | 2 | 3350 | 4 1/2 x 5 1/2 | 36x4* | 36x7* | W |
| Maccari, L | 1 1/2 | 2925 | 4 1/2 x 5 1/2 | 36x4 | 36x6 | W | Patriot, Lincoln | 1 1/2 | 2450 | 4 x 5 1/2 | 34x3 1/2 | 34x5* | W | Sullivan, H | 3 1/2 | 4650 | 4 1/2 x 6 | 36x5 | 36x5d | W |
| Maccari, H-2 | 2 1/2 | 3650 | 4 1/2 x 5 1/2 | 36x4 | 36x4d | W | Patriot, Washg'tn | 1 1/2 | 3450 | 4 1/2 x 5 1/2 | 36x4* | 36x7* | W | Superior, D | 1 | 1650 | 3 1/2 x 5 | 34x4 1/2 | 34x4 | I |
| Maccari, M-2 | 3 1/2 | 4500 | 4 1/2 x 6 | 36x5 | 36x5d | W | Piedmont, 4-30 | 1 1/2 | 1685 | 3 1/2 x 5 | 34x4 1/2 | 34x4 1/2 | W | Superior, E | 2 | 2600 | 4 1/2 x 5 1/2 | 34x4 | 36x6 | I |
| Maccari, G | 5 | 5500 | 4 1/2 x 6 | 36x5 | 40x6d | W | Pierce-Arrow, | 2 | 3750 | 4 x 5 1/2 | 36x4 | 36x4d | W | Super Truck, 50 | 2 1/2 | 3300 | 4 x 6 | 36x4 | 36x8 | W |
| MacDonald, A | 7 1/2 | 5750 | 4 1/2 x 6 | 40x7 | 40x14 | I | Pierce-Arrow | 3 1/2 | 4950 | 4 1/2 x 6 1/2 | 36x5 | 36x5d | W | Super Truck, 70 | 3 1/2 | 4300 | 4 1/2 x 6 | 36x5 | 40x5d | W |
| Mack, AB D.R. | 1 1/2 | 3450 | 4 x 5 | 36x4 | 36x3 1/2 | D | Pioneer, 59 | 5 | 5700 | 4 1/2 x 6 1/2 | 36x5 | 40x6d | W | Super Truck, 100 | 5 | 5300 | 4 1/2 x 6 | 36x5 | 40x12 | W |
| Mack, AB | 1 1/2 | 3400 | 4 x 5 | 36x4 | 36x4d | C | Pittsburgh, B 21 | 2 1/2 | 1550 | 3 1/2 x 5 1/2 | 32x4 1/2 | 32x4 1/2 | I | Super Truck 150 | 7 1/2 | 6300 | 5 x 6 | 36x6 | 40x7d | W |
| Mack, AB Chain | 1 1/2 | 3000 | 4 x 5 | 36x4 | 36x4 1/2 | C | Pony | 4 | 4800 | 4 1/2 x 5 1/2 | 36x5* | 36x7* | W | Texas, A38 | 1 1/2 | 1095 | 3 1/2 x 5 | 33x4 | 33x4 | I |
| Mack, AB Chain | 2 | 3300 | 4 x 5 | 36x4 | 36x4d | C | Power, F | 1 1/2 | ... | 3 1/2 x 5 1/2 | 36x6 | 36x6 | W | Texas, TK39 | 1 1/2 | 1550 | 3 1/2 x 5 | 36x6 | 38x7 | W |
| Mack, AB D.R. | 2 1/2 | 3750 | 4 x 5 | 36x4 | 36x4d | D | Power, C | 1 1/2 | ... | 3 1/2 x 5 1/2 | 36x5 | 40x10 | W | Tiffin, GW | 1 1/2 | 2695 | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W |
| Mack, AC Chain | 3 1/2 | 4950 | 5 x 6 | 36x5 | 40x5d | C | Premocar, B-143 | 1 1/2 | 2475 | 3 1/2 x 5 | 36x6 1/2 | 36x6 1/2 | W | Tiffin, MW | 1 1/2 | 3580 | 4 1/2 x 5 1/2 | 36x4 | 36x3 1/2 | W |
| Mack, AC Chain | 5 | 5500 | 5 x 6 | 36x6 | 40x6d | C | Rainier, R-11 | 1 1/2 | 2150 | 3 1/2 x 5 | 35x5 1/2 | 35x5 1/2 | I | Tiffin, PW | 3 1/2 | 4760 | 4 1/2 x 5 1/2 | 36x5 | 40x5d | W |
| Mack, AC Chain | 6 1/2 | 5750 | 5 x 6 | 36x6 | 40x12 | C | Rainier, R-19 | 1 | 2350 | 3 1/2 x 5 | 34x3 1/2 | 34x4 | W | Tiffin, F50 | 5 | 5850 | 4 1/2 x 6 | 36x6 | 40x6d | W |
| M | | | | | | | | | | | | | | | | | | | | |

Specifications of Current Motor Truck Models—Continued

| NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive | NAME AND MODEL | Tons Capacity | Chassis Price | Bore and Stroke | TIRES | | Final Drive |
|-----------------|---------------|---------------|-----------------|----------|----------|-------------|---|---------------|---------------|-----------------|----------|----------|-------------|----------------|---------------|---------------|-----------------|----------|-----------|-------------|
| | | | | Front | Rear | | | | | | Front | Rear | | | | | | Front | Rear | |
| Ward-LaF., 5A | 5 | \$5590 | 5 x 6 1/2 | 36x6 | 36x6d | W | Wichita, O | 3 1/2 | \$4000 | 4 1/2 x 6 | 36x5 | 36x5d | W | Winther, 430 | 1 1/2 | \$2850 | 3 1/2 x 5 | 32x4 | 32x4 | I |
| Watson, E | 6-12 | 1865 | 3 1/2 x 5 1/2 | 34x4 1/2 | 34x4 1/2 | W | Wichita, S | 5 | 5000 | 4 1/2 x 6 | 36x6 | 40x6d | W | Winther, 39 | 1 1/2 | 2450 | 3 1/2 x 5 | 34x3 1/2 | 34x5 | I |
| Watson, N | 3 1/2 | 4250 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | W | Wilcox, AA | 1 | 2100 | 3 1/2 x 5 1/2 | 36x4 | 36x4 | W | Winther, 49 | 2 | 3250 | 4 x 5 | 34x4 | 34x4d | I |
| Western, W1 1/2 | 1 1/2 | 2550 | 4 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | Wilcox, B | 1 1/2 | 2775 | 4 1/2 x 5 | 36x4 | 36x5 | W | Winther, 70 | 3 1/2 | 4200 | 4 x 6 | 36x5 | 36x5d | I |
| Western, L1 1/2 | 1 1/2 | 2550 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W | Wilcox, D | 2 1/2 | 3300 | 4 1/2 x 5 | 36x4 | 36x3 1/2 | W | Winther, 450 | 4 | 3690 | 4 x 5 | 34x5 | 36x6 | I |
| Western, W2 1/2 | 2 1/2 | 3250 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Wilcox, E | 3 1/2 | 4250 | 4 1/2 x 6 | 36x5 | 36x5d | W | Winther, 109 | 5 | 5250 | 4 1/2 x 6 | 36x6 | 40x5d | I |
| Western, L2 1/2 | 2 1/2 | 3250 | 4 1/2 x 6 | 36x4 | 36x7 | W | Wilcox, F | 5 | 5200 | 4 1/2 x 6 1/2 | 36x5 | 40x6d | W | Winther, 140 | 7 | 5900 | 5 x 6 | 36x6 | 40x7d | I |
| Western, W3 1/2 | 3 1/2 | 4250 | 4 1/2 x 6 | 36x5 | 40x5d | W | Wilson, F | 1 1/2 | 2270 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W | Wisconsin B | 1 | 1950 | 4 x 5 1/2 | 34x5 1/2 | 34x5 1/2 | W |
| White, 15 | 3 1/2 | 2400 | 3 1/2 x 5 1/2 | 34x5 1/2 | 34x5 1/2 | B | Wilson, EA | 2 1/2 | 2825 | 4 1/2 x 5 1/2 | 36x4 | 36x7 | W | Wisconsin C | 1 1/2 | 2250 | 4 1/2 x 5 1/2 | 34x5 1/2 | 36x10 | W |
| White, 20 | 2 | 3250 | 3 1/2 x 5 1/2 | 36x4 | 36x7 | D | Wilson, G | 3 1/2 | 3685 | 4 1/2 x 5 1/2 | 36x5 | 36x5d | W | Wisconsin D | 2 1/2 | 3500 | 4 1/2 x 5 1/2 | 36x6 | 36x10 | W |
| White, 40 | 3 1/2 | 4200 | 3 1/2 x 5 1/2 | 36x5 | 40x5d | D | Wilson, H | 5 | 4520 | 4 1/2 x 6 | 36x6 | 40x6d | W | Wisconsin E | 3 1/2 | 4000 | 5 x 6 1/2 | 36x6 1/2 | 36x12 1/2 | W |
| White, 45 | 5 | 4500 | 4 1/2 x 5 1/2 | 36x6 | 40x6d | D | Winther, 751 | 3 1/2 | 1795 | 3 1/2 x 5 | 34x4 1/2 | 35x5 1/2 | W | Witt-Will, N | 1 1/2 | 2750 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W |
| White Hick., E | 1 | 2450 | 3 1/2 x 5 | 34x5 1/2 | 34x5 1/2 | W | *2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made. | | | | | | | | | | | | | |
| White Hick., H | 1 1/2 | 2750 | 3 1/2 x 5 | 36x3 1/2 | 36x5 | W | Final Drive: W—Worm, I—Internal Gear, C—Chain, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ‡—Price includes body. §—Price includes several items of equipment. | | | | | | | | | | | | | |
| White Hick., K | 2 1/2 | 3350 | 4 1/2 x 5 1/2 | 36x4 | 36x5 | W | | | | | | | | Wolverine, J | 1 1/2 | 2125 | 3 1/2 x 5 | 34x3 1/2 | 34x4 | I |
| Wichita, K | 1 | 2300 | 3 1/2 x 5 1/2 | 36x3 | 36x4 | W | | | | | | | | Wolverine, J | 2 | 2640 | 3 1/2 x 5 | 34x3 1/2 | 34x7 | I |
| Wichita, L | 1 1/2 | 2600 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x5 | W | | | | | | | | Wolverine, J | 2 1/2 | 3425 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | I |
| Wichita, M | 2 | 2800 | 3 1/2 x 5 1/2 | 36x3 1/2 | 36x6 | W | | | | | | | | Wolverine, L | 3 1/2 | 4100 | 4 1/2 x 5 1/2 | 36x5 | 36x10 | I |
| Wichita, R | 2 1/2 | 3000 | 3 1/2 x 5 1/2 | 36x4 | 36x7 | W | | | | | | | | Yellow Cab M21 | 3 1/2 | 2050 | 3 1/2 x 5 | 32x4 | 32x4 | B |
| Wichita, RX | 2 1/2 | 3600 | 4 1/2 x 6 | 36x4 | 36x8 | W | | | | | | | | Yellow Cab M41 | 1 1/2 | 2350 | 3 1/2 x 5 | 34x4 1/2 | 34x4 1/2 | W |

Farm Tractor Specifications and Prices

| TRADE NAME | Rating | Price | Wheels or Crawlers | Engine | Cylinders: Bore, Stroke | Fuel | Pump Capacity | TRADE NAME | Rating | Price | Wheels or Crawlers | Engine | Cylinders: Bore, Stroke | Fuel | Pump Capacity | TRADE NAME | Rating | Price | Wheels or Crawlers | Engine | Cylinders: Bore, Stroke | Fuel | Pump Capacity |
|-------------------|---------|--------|--------------------|--------|-------------------------|--------|---------------|------------------|--------|--------|--------------------|--------|-------------------------|-------|---------------|-----------------|--------|--------|--------------------|--------|-------------------------|--------|---------------|
| All-In One | 16-30 | \$1975 | 3 | Clim. | 4-5 x 6 1/2 | GDK | 3-4 | Gray, 1920 | 18-36 | \$2000 | 3 | Wauk | 4-4 1/2 x 6 1/2 | Gas. | 4 | Port Huron, A | 12-25 | \$1700 | 4 | Chief | 4-4 1/2 x 6 | G,K | 3 |
| Allis-Chalm. B | 6-12 | 925 | 2 | LeR. | 4-3 1/2 x 5 1/2 | Gas. | 1-2 | Ground Hog | 19-31 | 2000 | 4 | Erd. | 4-4 x 6 | GorK | 3 | Post, D | 12-20 | 1800 | 4 | Wauk | 4-4 1/2 x 5 1/2 | GorK | 2 |
| Allis-Chalm. G.P. | 6-12 | 850 | 2 | LeR. | 4-3 1/2 x 5 1/2 | Gas. | 1-2 | Gt. Western St | 20-30 | 1950 | 4 | Beav. | 4-4 1/2 x 6 | K. | 4 | Prairie Dog, L | 9-18 | 650 | 3 | Wauk | 4-3 1/2 x 5 1/2 | Gas. | 2 |
| Allis-Chalm. L | 10-18 | 2150 | 4 | Own | 4-4 1/2 x 6 1/2 | GorK | 3-4 | Hart-Parrr. 20 | 20 | 995 | 4 | Own | 2-5 1/2 x 6 1/2 | K,D | 3 | Prairie Dog, D | 15-30 | 1250 | 4 | Wauk | 4-4 1/2 x 6 1/2 | Gas. | 3 |
| Allis-Chalm. M | 10-18 | 875 | 4 | Own | 4-4 1/2 x 6 1/2 | G,K | 4 | Hart-Parrr. 30 | 30 | 1595 | 4 | Own | 2-6 1/2 x 7 | K,D | 3 | Ranger Cul | 8-16 | ..... | 4 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 1 |
| Allwork, 2-G | 14-28 | 1875 | 4 | Own | 4-4 1/2 x 6 1/2 | GorK | 3 | Heider, C | 9-16 | 1170 | 4 | Wauk | 4-4 1/2 x 5 1/2 | G,K | 2 | T-20 | 8-16 | ..... | 4 | Dom | 4-4 1/2 x 6 | K. | 3-4 |
| Allwork, C | 12-20 | 1675 | 4 | Own | 4-5 x 6 | GorK | 3 | Heider, D | 12-20 | 1395 | 4 | Wauk | 4-4 1/2 x 6 1/2 | G,K | 3 | Reed, A-1 | 15-30 | 2250 | 4 | Dom | 4-5 x 6 | Gas. | 4 |
| Andrews-Kin.D | 18-36 | 2500 | 4 | Clim. | 4-5 x 6 1/2 | GorK | 4 | Heider, Cult | 6-10 | 1050 | 4 | LeR. | 4-3 1/2 x 5 1/2 | G,K | 1 | Reliable | 10-20 | 985 | 4 | Own | 2-6 x 7 | Ker. | 2 |
| Appleton | 12-20 | 1500 | 4 | Buda | 4-4 1/2 x 5 1/2 | G,K | 2-3 | Hicks | 20-30 | ..... | 4 | Wauk | 4-4 1/2 x 6 | GorK | 4 | Rex | 12-25 | 1600 | 4 | Wauk | 4-4 1/2 x 5 1/2 | GorK | 3 |
| Aro, 1921 | 3-5 | 550 | 4 | Own | 1-4 1/2 x 5 1/2 | Gas. | 1 | Huber Light 4 | 12-25 | 1185 | 4 | Wauk | 4-4 1/2 x 5 1/2 | GorK | 3 | Russell | 12-24 | 1500 | 4 | Own | 4-4 1/2 x 5 1/2 | GorK | 2-3 |
| Aultman-T. | 15-30 | 2200 | 4 | Clim. | 4-5 x 6 1/2 | G,K | 4 | Huber Super 4 | 15-30 | 1885 | 4 | Midw. | 4-4 1/2 x 6 | Gas. | 3 | Russell | 15-30 | 2200 | 4 | Own | 4-5 x 6 1/2 | GorK | 3-4 |
| Aultman-T. | 22-45 | 3850 | 4 | Own | 4-5 1/2 x 8 | G,K | 6 | Illinois, Super | 18-36 | 2500 | 4 | Clim. | 4-5 x 6 1/2 | G,K | 4 | Russell | 20-35 | 3000 | 4 | Own | 4-5 1/2 x 7 | GorK | 4-5 |
| Aultman-T. | 30-60 | 5000 | 4 | Own | 4-7 x 9 | G,K,D | 8 | Imperial, E | 40-70 | 5000 | 4 | Own | 4-7 1/2 x 9 | G,K,D | 10 | Russell | 30-60 | 5000 | 4 | Own | 4-8 x 10 | GorK | 8-10 |
| Automot. B-3 | 12-24 | 1785 | 4 | Herc. | 4-4 x 5 1/2 | Gas. | 2-3 | Indiana, F | 5-10 | ..... | 2 | LeR. | 4-3 1/2 x 5 1/2 | Gas. | 1-2 | Samson, M | ..... | 795 | 4 | Nov. | 4-4 x 5 1/2 | G,K | 2 |
| Avery, SR, Cul | 5-10 | ..... | 3 | Own | 4-3 x 4 | G,K | 2 | International, F | 8-16 | 900 | 4 | Own | 4-4 1/2 x 5 1/2 | G,K,D | 2 | Sandusky, J | 10-20 | 1250 | 4 | Own | 4-4 1/2 x 5 1/2 | G,K,D | 2 |
| Avery, Cult-C | ..... | ..... | 3 | Own | 6-3 x 4 | G,K | 2 | International, I | 15-30 | 1750 | 4 | Own | 5-1/2 x 8 | G,K,D | 4 | Sandusky, E | 15-35 | 1750 | 4 | Own | 4-5 x 6 1/2 | G,K,D | 4 |
| Avery, B | 5-10 | ..... | 4 | Own | 6-3 x 4 | G,K | 2 | J-T | 20-40 | 3485 | 2 | Chief | 4-4 1/2 x 6 | G,K,D | 3-4 | Shawnee Com. | 6-12 | ..... | 2 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 10 |
| Avery, C | 8-16 | ..... | 4 | Own | 2-5 1/2 x 6 | G,K,D | 2-3 | Knudsen, 1920 | 25-45 | 2500 | 4 | Own | 4-5 x 9 | Gas. | 4-6 | Shawnee Com. | 9-18 | ..... | 2 | Gray | 4-3 1/2 x 5 | Gas. | 3 |
| Avery, D | 12-20 | ..... | 4 | Own | 4-4 1/2 x 6 | G,K,D | 2-3 | Klumb, F | 16-32 | 1650 | 4 | Clim. | 4-5 x 6 1/2 | Gas. | 3 | Shelby, D | 15-30 | ..... | 4 | Beav. | 4-4 1/2 x 6 | G,K | 3 |
| Avery, E | 12-25 | ..... | 4 | Own | 2-6 1/2 x 7 | G,K,D | 3-4 | Knudsen, 1920 | 25-45 | 2500 | 4 | Own | 4-5 x 9 | Gas. | 4-6 | Shelby, C | 10-20 | ..... | 4 | Erd. | 4-4 x 6 | GorK | 2-3 |
| Avery, F | 14-28 | ..... | 4 | Own | 4-4 1/2 x 6 | G,K,D | 3-4 | LaCrosse, M | 6-12 | 900 | 4 | Own | 2-4 x 6 | G,K | 1 | Short Turn | 20-40 | 1500 | 3 | Beav. | 4-4 1/2 x 6 | G,K | 3 |
| Avery, G | 18-36 | ..... | 4 | Own | 4-4 1/2 x 6 | G,K,D | 4-5 | LaCrosse, G | 12-24 | 1250 | 4 | Own | 2-6 x 7 | GorK | 3 | Square 1 | 18-35 | 2075 | 3 | Clim. | 4-5 x 6 1/2 | K,G | 3 |
| Avery, H | 25-50 | ..... | 4 | Own | 4-6 1/2 x 7 | G,H,D | 5-6 | Lauson, C | 12-25 | 1495 | 4 | Midw. | 4-4 1/2 x 5 1/2 | Gas. | 3-4 | Steady Pull | 12-24 | 1485 | 4 | ..... | 4-4 x 5 | Gas. | 3 |
| Avery, I | 45-65 | ..... | 4 | Own | 4-7 1/2 x 8 | G,K,D | 9-10 | Lauson, D | 15-25 | 1685 | 4 | Beav. | 4-4 1/2 x 6 | GorK | 3-4 | Stinson, 4E | 18-36 | 1835 | 4 | Beav. | 4-4 1/2 x 6 | G,K | 4 |
| Bates | 15-25 | ..... | 4 | Own | 4-4 1/2 x 6 | Ker. | 3 | Lauson, E | 15-30 | 1985 | 4 | Beav. | 4-4 1/2 x 6 | GorK | 3-4 | Stone | 20-40 | 2250 | 4 | Beav. | 4-4 1/2 x 6 | G,K | 4 |
| Bates Mule, H | 15-25 | ..... | 4 | Midw. | 4-4 1/2 x 6 1/2 | Gas. | 3 | Leader, B | 12-18 | 1095 | 4 | Own | 2-6 x 6 1/2 | G,K,D | 2-3 | Tioga | 15-27 | 2625 | 4 | Wisc. | 4-4 1/2 x 6 | Gas. | 3-4 |
| Bates Mule, F | 18-25 | ..... | 2 | Midw. | 4-4 1/2 x 6 1/2 | Gas. | 3 | Leader, C | 16-32 | 1985 | 4 | Clim. | 4-5 x 6 1/2 | G,K | 3-4 | Titan | 10-20 | 900 | 4 | Own | 2-6 1/2 x 8 | G,K,D | 3 |
| Bates Mule, G | 25-35 | ..... | 2 | Midw. | 4-4 1/2 x 6 | Gas. | com. | Leader, GU | 18-35 | 2775 | 2 | Clim. | 4-5 x 6 1/2 | G,K | 3-4 | Topp, B | 30-45 | 3500 | 4 | Wauk | 4-4 1/2 x 6 1/2 | Gas. | 3-4 |
| Beane | 8-16 | ..... | 1 | Own | 4-3 1/2 x 4 | G,K | 2-3 | Leonard, E | 20-30 | 2530 | 4 | Buda | 4-4 1/2 x 6 | G,K | 3 | Toro Cultivator | 6-10 | ..... | 3 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 2 |
| Beeman, G | 2-4 | 315 | 4 | Own | 1-3 1/2 x 4 1/2 | Gas. | 1 1/2 | Liberty, A | 18-32 | 2475 | 4 | Clim. | 4-5 x 6 1/2 | G,K | 3 | Townsend | 10-20 | 1200 | 2 | Own | 4-6 1/2 x 7 | Ker | 2-3 |
| Best | 30 | ..... | 2 | Own | 4-4 1/2 x 6 1/2 | G,K,D | 4 | Linn, HAJ | 40 | 5100 | 2 | Wauk | 4-5 x 6 1/2 | Gas. | 6 | Townsend | 15-30 | 1800 | 2 | Own | 4-7 x 8 | Ker | 3-4 |
| Best | 60 | ..... | 2 | Own | 4-6 1/2 x 8 1/2 | G,K,D | 8-9 | Linn, W | 60 | 5100 | 2 | Wauk | 4-5 x 6 1/2 | Gas. | 6 | Townsend | 25-50 | 3000 | 2 | Own | 4-8 1/2 x 10 | Ker | 4-5 |
| Boring, 1921 | ..... | 1850 | 3 | Wauk | 4-4 1/2 x 5 1/2 | GorK | 2 | Little Giant, B | 16-22 | 2200 | 4 | Own | 4-4 1/2 x 5 | K. | 4 | Traction Motor | 40-50 | ..... | 4 | ..... | 8-3 1/2 x 5 | Gas. | 4-5 |
| Burns-Oil 1921 | 15-30 | 1650 | 4 | Own | 2-6 1/2 x 7 | Ker. | 3-4 | Little Giant, A | 26-35 | 3300 | 4 | Own | 4-5 1/2 x 6 | K. | 6 | Traylor, TB | 6-12 | 715 | 4 | LeR. | 4-3 1/2 x 4 1/2 | Gas. | 1 |
| Capital | 15-30 | 1000 | 2 | Own | 4-4 1/2 x 6 | Gas. | 3 | Lombard | 85-150 | ..... | 2 | ..... | 6-5 1/2 x 6 1/2 | Gas. | 16 | Triumph, H | 18-36 | 2450 | 2 | Erd. | 4-4 1/2 x 6 | Ker. | 4 |
| Case | 10-18 | 1090 | 4 | Own | 4-3 1/2 x 5 | GorK | 2 | Lombard | 50 | ..... | 2 | ..... | 4-4 1/2 x 6 1/2 | Gas. | 6-10 | Trundaar, 10 | 25-40 | 3750 | 2 | Wauk | 4-5 x 6 1/2 | GorK | 4 |
| Case | 15-27 | 1680 | 4 | Own | 4-4 1/2 x 6 | GorK | 3 | Magnet, B | 14-28 | 1875 | 4 | Wauk | 4-4 1/2 x 6 1/2 | K&G | 3 | Turner, 1921 | 14-25 | 1925 | 4 | Buda | 4-4 1/2 x 6 1/2 | G,K | 3 |
| Case | 22-40 | 3100 | 4 | Own | 4-5 1/2 x 6 1/2 | GorK | 4-5 | Master Jr | 5-10 | 585 | ..... | LeR. | 4-3 1/2 x 4 | Gas. | 1 | Twin City | 12-20 | 1580 | 4 | Own | 4-4 1/2 x 6 | G,K | 3 |
| Caterpillar T11 | 25 | ..... | 2 | Own | 4-4 1/2 x 6 | Gas. | 4 | Merry Gar1921 | 2 | 230 | 2 | Evin | 1-2 1/2 x 5 1/2 | Gas. | 3 | Twin City | 20-35 | 3175 | 4 | Own | 4-4 1/2 x 6 1/2 | G,K | 5 |
| Caterpillar T16 | 40 | ..... | 2 | Own | 4-6 1/2 x 7 | GorK | 4-5 | Minne. All-P | 12-25 | 1230 | 4 | Own | 4-4 1/2 x 7 | GorK | 3-4 | Twin City | 40-65 | 5250 | 4 | Own | 4-7 1/2 x 9 | G,K | 8 |
| Centaur | 5-2 1/2 | 455 | 2 | NWay | 2-4 1/2 x 4 1/2 | G or K | 1-3 | Minne. Gen-P | 17-30 | 1850 | 4 | Own | 4-4 1/2 x 7 | GorK | 3-4 | Uncle Sam C20 | 12-20 | 1385 | 4 | Beav. | 4-4 x 5 1/2 | G | 2-3 |
| Chase | 12-25 | 2100 | 3 | Buda | 4-4 1/2 x 5 1/2 | G,K | 2-3 | Minne. Gen-P | 17-30 | 1850 | 4 | Own | 4-4 1/2 x 7 | GorK | 3-4 | Uncle Sam B19 | 20-30 | 2035 | 4 | Wisc. | 4-4 1/2 x 6 | GorK | 3-4 |
| Chicago, 40 | 40 | 2500 | 4 | Own | 4-4 1/2 x 6 | Gas. | 4 | Minne. | ..... | ..... | 4 | Own | 4-6 x 7 | GorK | 5-6 | Uncle Sam D21 | 20-30 | 1985 | 4 | Beav. | 4-4 1/2 x 6 | G or K | 3-4 |
| Cletrac, W | 12-20 | 1495 | 2 | Own | 4-4 x 5 1/2 | G,K,D | 2-3 | Med.Duty | 22-44 | 3300 | 4 | Own | 4-6 x 7 | GorK | 5-6 | Universal | 1-4 | 475 | 2 | Own | 1-3 1/2 x 5 | G | 1 |
| Dakota, 4 | 15-27 | 1750 | 3 | Dom. | 4-4 1/2 x 6 | Gas. | 3 | Minne. | ..... | ..... | 4 | Own | 4-6 x 7 | GorK | 5-6 | Utilitor, 501 | 2 1/2 | 380 | 4 | Own | 1-3 1/2 x 4 1/2 | G | 5 |
| Dart, B.J. | 15-30 | 2100 | 4 | Buda | 4-4 1/2 x 6 | Gas. | 3-4 | HeavyDuty | 35-70 | 4600 | 4 | Own | 4-7 1/2 x 9 | GorK | 8-9 | Valie, Biltweil | 12-24 | 1750 | 4 | Own | 4-4 1/2 x 5 1/2 | G,K,D | 3 |
| Deputa, A | 20-30 | 2500 | 4 | Buda | 4-4 1/2 x 6 | Gas. | 3 | Mohawk, 1921 | 8-16 | 785 | 4 | Light | 4-3 1/2 x 5 1/2 | GorG, | 1-2 | Waterloo, N | 12-25 | ..... | 4 | Own | 2-6 1/2 x 7 | G,K | 3 |
| Dill, D | 20 | 2480 | 4 | Cont. | 4-4 1/2 x 5 1/2 | Gas. | 3 | Moline Univ D | 9-18 | 900 | 2 | Own | 4-3 1/2 x 5 1/2 | Gas. | 2-3 | Weboot, 53 | 28-53 | 5250 | 2 | Wisc. | 4-5 1/2 x 7 | G,D | 6 |
| Do, R.W. | 20 | 2980 | 4 | Midw. | 4-4 1/2 x 6 | Gas. | 3 | Moline Orch. | 9-18 | 1075 | 2 | Own | 4-3 1/2 x 5 1/2 | Gas. | 2-3 | Wellington, B | 12-22 | 900 | 4 | Erd. | 4-4 x 6 | Ker. | 2-3 |
| Do-it-All | -7 | 595 | ..... | Own | 1-4 1/2 x 5 | Gas. | ..... | Motor Macult. | 1 1/2 | 195 | 2 | Own | 1-2 1/2 x 5 1/2 | Gas. | 2-3 | Wellington, F | 16-30 | 1400 | 4 | Chief | 4-4 1/2 x 6 | Ker. | 3-4 |
| Eagle, F | 12-22 | 1390 | 4 | Own | 2-7 x 8 | GorK | 3-4 | Motex | 15-30 | 2250 | 4 | Buda | 4-4 1/2 x 6 | Gas. | 3-4 | Western, 1920 | 16-32 | 2100 | 4 | Clim. | 4-5 1/2 x 6 | Gas. | 4 |
| Eagle, F | 16-30 | 1850 | 4 | Own | 2-8 x 8 | GorK | 4-5 | NB | 3-6 | 425 | 4 | Own | 2-3 1/2 x 4 | Gas. | 3 | Wetmore | 12-25 | 1650 | 4 | Wauk | 4-4 x 5 1/2 | G,K | 3 |
| E-B, AA | 12-20 | 1445 | 4 | Own | 4-4 1/2 x 5 | GorK | 3 | NB | 3-6 | 425 | 4 | Own | 2-3 1/2 x 4 | Gas. | 3 | Wharton, E | 12-20 | 1800 | 3 | Buda | 4-4 1/2 x 5 1/2 | Gas. | 2 |
| E-B, Q | 12-20 | 925 | 4 | Own | 4-4 1/2 x 5 | GorK | 3 | Nichols-Shep. | 20-42 | 3100 | 4 | Own | 8 x 10 | GorK | 3-6 | Whitney, .. | 9-18 | 1175 | 4 | Own | 2-5 1/2 x 6 1/2 | Gas. | 2 |
| E-B, R | 16-32 | 2000 | 4 | Own | 4-5 1/2 x 7 | GorK | 4 | Nichols-Shep. | 25-50 | 3460 | 4 | Own | 9 x 12 | GorK | 4-7 | Wichita, T | 15-30 | 2500 | 4 | Beav. | 4-4 1/2 x 6 | G,K,D | 3-4 |
| Evans | 18-30 | 2000 | 4 | Buda | 4-4 1/2 x 6 | G,K | 3 | Nichols-Shep. | 25-50 | 3460 | 4 | Own | 9 x 12 | GorK | 4-7 | Wisconsin, E | 16-30 | 2250 | 4 | Clim. | 4-5 x 6 1/2 | Ker. | 4 |
| Fageol, D | 9-12 | 1525 | 4 | Lye. | 4-3 1/2 x 5 | Gas. | 2 | Nilson Jr., E | 15-25 | 1775 | 4 | Wauk | 4-4 1/2 x 5 1/2 | G,K | 3 | Wisconsin, H | 22-40 | 3200 | 4 | Clim. | 4-5 1/2 x 7 | Ker. | 4 |
| Farm Horse, B | 18-30 | 1885 | 4 | Clim. | 4-5 x 6 1/2 | G,K | 3-4 | Nilson Senior | 20-40 | 2475 | 5 | Wauk | 4-5 x 6 1/2 | G,K | 4 | Yuba, 15-25 | 15-25 | 2945 | 2 | Wisc. | 4-4 x 6 | G,K,D | ..... |
| Farquhar | 15-25 | ..... | 4 | Buda | 4-4 1/2 x 6 | G,K,D | 4-5 | Oil Pull, K | 12-20 | 1485 | 4 | Own | 2-6 x 8 | K,D | 3 | Yuba, 25-40 | 25-40 | 4892 | 2 | Wisc. | 4-5 1/2 | | |

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

| | | |
|------------------|--|------------------------------|
| Denver | Motor Car Festival | Aug. 10 to 13 |
| Toronto, Canada | National Motor Show | Aug. 27 |
| Toronto, Canada | Canadian National Exposition | Aug. 29—Opens |
| Milwaukee | State Fair Automobile Show | Aug. 29—Sept. 3 |
| Indianapolis | Automobile and Accessory Show | Sept. 6-10 |
| Cincinnati | Fall Automobile Show | Oct. 1-8 |
| Olympia, England | Automobile Show | Nov. 3-12 |
| Chicago | Automotive Equipment Show | Nov. 14-19 |
| New York | Automobile Salon | Nov. 27-Dec. 3 |
| Chicago | Automobile Salon | January, 1922 |
| New York | National Automobile Show | Jan. 7-13, 1922 |
| Chicago | National Automobile Show | Jan. 28-Feb. 3, 1922 |
| Minneapolis | Tractor Show | Jan. 30 to Feb. 4, inclusive |
| Winnipeg, Canada | Canadian Automotive Equipment Ass'n Show | Feb. 6-11 |

RACES

| | | |
|--------------------|-------------------------|-------------|
| Cotati, Calif. | Opening of New Speedway | August 14 |
| Pikes Peak | Hill Climb | September 5 |
| Uniontown Speedway | Annual Autumn Classic | September 5 |
| Los Angeles | Speedway Race | November 24 |

FOREIGN SHOWS

| | | |
|-------------------------|---|-----------|
| Buenos Aires, Argentina | Passenger Cars and Equipment | September |
| Luxemburg | Agricultural Sample Exhibition | September |
| Paris, France | Paris Motor Show | Oct. 5-16 |
| London | British Motor Show, Society Motor Mfgs. and Traders | Nov. 4-11 |

CONVENTIONS

| | | |
|-----------|--|------------|
| Chicago | Twenty-eighth Annual Convention National Implement & Vehicle Association | Oct. 12-24 |
| Cleveland | National Tire Dealers' Association | November |
| Chicago | Chicago Semi-Annual Convention of Factory Service Managers N. A. C. C. | Nov. 22-24 |
| New York | Service Managers Convention | Nov. 22-24 |

Business Notes

Oliver Mfg. Co., Milwaukee, in changing its corporate name to Oliver-Barth Jack Co., marks the formal consolidation of the Oliver company with the Barth Mfg. Co., both specializing in the manufacture of lifting jacks and similar automotive equipment. The Oliver company, originally established in Chicago, was acquired by Milwaukee interests identified with the Northwestern Malleable Iron Co. of Milwaukee about a year ago and the plant was moved there.

E. L. M. Tire & Rubber Co., Racine, Wis., is now operating in its new plant of about 20,000 sq. ft., at Deane boulevard and the Milwaukee road tracks. It was organized several months ago with \$200,000 capital and absorbed the E-Z Rubber Mfg. Co. of Racine.

Marathon Rubber Products Co., Wausau, Wis., which recently took over the property of the Burlock Rubber Co. of the same city, has plans for a brick and steel factory addition, 60x120 ft., one story. It is to be ready about Sept. 1.

National Motor Accessories Corp., New York, has undertaken the formation of a chain store organization to distribute accessories, including a number of branded lines bearing the name "Naco."

Ginsberg Motor Co., Montreal, has been appointed sales representative for all of eastern Canada for the Rolls-Royce, and by the end of the month will have the latest English model on exhibition at the salesroom. Ginsberg Motor Co. will be represented in all of the principal cities of eastern Canada, and has obtained allotted dates for a number of early deliveries.

HARDWARE EXHIBIT IN OCT.

Philadelphia, Aug. 5—The fourth annual meeting and exhibition of the Automobile Accessories Branch of the National Hardware Assn. of the United States will be held on the Million Dollar Pier, Atlantic City, Oct. 19 to 22, inclusive. The exhibition will immediately follow the twenty-seventh annual convention of the general association.

Asks Authority to Pay Portion of Standard Parts' Debts

Cleveland, Aug. 5—Frank I. Scott, receiver of the Standard Parts Co., has asked Federal Judge D. C. Westhaver for authority to pay a 10 per cent dividend upon the indebtedness of the company. He reports that he has \$1,538,269



WHEN the customer drives out, would your conscience bother you should you see him returning?

in cash out of which the proposed dividend is to be paid. His report for the period from March 30 to June 30 shows gross sales of \$3,321,087, a loss of \$65,010.67 in March, \$20,176.47 in April and \$44,219.20 in June, and a profit of \$9,880.83 in May, making a loss for the four months of \$129,525.51 after allowing for depreciation, insurance and taxes, but not for interest on indebtedness.

"Disregarding the item of depreciation of \$255,973.03, which is purely a book charge and which it is not customary to include in the bookkeeping of a receivership, a monetary gain would be shown during the four months of \$126,447.52." The report states: "Disregarding the depreciation for the entire period of the receivership would show a monetary loss of \$60,931.48." "It is felt that we have gone through the worst and that while the future may be uncertain there will be business enough to admit of successful operation," Scott says in closing his report.

July Proves Bonanza for Car Dealers in Milwaukee

Milwaukee, Aug. 5—In footing up accounts for July, Milwaukee dealers generally find that their business volume for the past month is anywhere from 5 to 20 per cent in excess of June trade, and in excess of the volume of July, 1920. A few dealers fell behind the previous month and the corresponding period last year, but the majority are able to report gains of a more or less substantial nature.

In dollars and cents, the July business this year fell behind last year, which is nothing more than natural in view of the marked reductions which have been effected in selling prices within the year. Prospects for August are regarded as favorable, especially with the stimulus in the foreground furnished by the annual fall show in connection with the Wisconsin State Fair, Aug. 29 to Sept. 3. This is primarily a distributors' advantage but retail sales also are materially improved at the same time.

PREPARES FOR PIKE CLIMB

Denver, Aug. 5—The annual Pike's Peak hill climb will be held on Labor Day. This is the event in which the stock cars come into their own. This year the entries promise to be in larger number than last year when 24 crossed the starting line. The race is up a 12½-mile course with hardly a quarter mile of straight-away road, reaching to the highest point possible to be made by a motor car. The average grade is 7½ per cent, while a maximum of 10 per cent is not infrequent.

The race last year was won by a Lexington, driven by Ot Loesche, in a blizzard of sleet and snow. A Lexington driven by Al Cline was second, while a Hudson, with Fred Junk at the wheel, was third. Preparations for the race this fall are already under way and the Colorado Chamber of Commerce is doing everything possible to make it the greatest "climb" ever held.